The Agribusiness Project (TAP)

Under Sub Agreement UAP-ISC-012-001-CNFA

Apricot
Value Chain Assessment Final Report
for the
Agribusiness Project

Adam Sendall
Masood Mir
Abdul Khabir
28th March, 2013

Submitted to:
CNFA, Inc.
1828 L Street, NW, Suite 710
Washington, DC 20036
202-296-3920 (tel)
202-296-3948 (fax)
www.cnfa.org

DISCLAIMER

This study is made possible by the generous support of the American people through the United States Agency for International Development (USAID). The contents are the responsibility of the author and do not necessarily reflect the views of USAID or the United States Government.

Acronyms & Abbreviations

ADB	Asian Development Bank
AKRSP	Aga Khan Rural Support Project
BDS	Business Development Services
DoA	Department of Agriculture
FEG	Farmer Enterprise Groups
FTA	Free Trade Area
GB	Gilgit-Baltistan
GDP	Gross Domestic Product
GI	Geographical Indication
GoP	Government of Pakistan
HACCP	Hazard Analysis and Critical Control Points
IMAP	International Markets Access Programme
ITC	International Trade Centre
KKH	Karakoram Highway
MARC	Mountain Agricultural Research Council
m asl	metres above sea level
MAFFA	Mountain Area Fruit Farmer Association
NAASD	Northern Areas Strategy for Sustainable Development
PKR	Pakistan Rupee
PPP	Public Private Partnerships
SAFTA	South Asian Free Trade Area
SESGBC	Socio-Economic Survey of Gilgit-Baltistan and Chitral
SESNAC	Socio-Economic Survey of Northern Areas and Chitral
TA	Technical Assistance
USAID	United States Agency for International Development
VCP	Value Chain Platforms

Exchange rate used: US$1 = PKR95

Table of Contents

ANNEXES

EXECUTIVE SUMMARY

The objective of appraising the apricot value chain is to recommend specific interventions for funding by the Agribusiness Project to strengthen the entire apricot sector and support achievement of the project's overall goal of broad-based economic growth, employment and poverty alleviation through increased competitiveness of the horticulture value chain. Interventions are expected to focus on integrating smallholder apricot producers into commercial value chains and be driven by food processing and value-addition for all apricot products.

Although Pakistan is a leading producer of apricot, most are consumed domestically and only a minor proportion is exported fresh or dried. Global market trends for apricot include an increasing trade in fresh fruit, whilst trade in dried apricot is stagnating. Nonetheless, there is increased interest in dried apricot as an ingredient in health foods such as breakfast muesli and cereal/fruit bars. Linked to the health factor is the use of organic certification as a marketing tool.

Gilgit-Baltistan and Balochistan are the main apricot growing regions in Pakistan. This study focused upon Gilgit-Baltistan. Located in the north, the region is isolated, the population small and dispersed, the terrain harsh and weather conditions variable. Only 1% of the land area is cultivated and average farm size is less than 1ha. Farming systems are subsistence oriented; however, apricots make a significant contribution to on-farm incomes. Due to the high perishability of apricot and distance from market, the majority of the harvest is dried on-farm and sold through wholesalers in auction markets down-country. Quality is generally poor and value low.

The appraisal judged the overall performance of the apricot sector as positive, although the business environment was having a mixed enabling affect upon sector performance. Whilst regulatory factors such as taxation and licensing were favourable, market related factors such as infrastructure, market information and standards were unfavourable. As the Department of Agriculture receives a tiny proportion of the Annual Development Budget, sector support programmes are reliant upon donor funding.

Several performance constraints were identified in the production, processing and trading components of the value chain, specifically with the technology, market structure and availability of input 'drivers'. These included the lack of improved commercial apricot cultivars to produce high quality marketable fruit and the absence of packaging, cold storage and refrigerated transport for trading in the high-value fresh apricot market. The export of quality processed apricot products to overseas buyers has started on a small-scale; however, creating additional export market linkages and satisfying quality standards is proving challenging for processors. Recommendations to improve performance of the apricot sector in Gilgit-Baltistan include the following:

1. Introduce, propagate and distribute improved commercial cultivars.
Improved commercial cultivars suitable for the fresh and dried market will first be identified. It is then proposed to develop a strategy with the Mountain Agricultural Research Council in Gilgit to rapidly propagate and distribute the improved varieties amongst clusters of Farmer Enterprise Groups. This may include establishing a central clonal garden in Gilgit and upgrading the Department of Agriculture nurseries in the target districts to bud/graft and

propagate the improved apricot seedlings. To fast-track the process it is recommended some budding/grating take place immediately, directly onto target farmers' existing apricot trees.

2. Improve orchard management and on-farm processing skills of apricot producers.
Several major changes are required to upgrade current apricot production into a commercially-oriented supply chain. Clusters of Farmer Enterprise Groups will be established and trained on improved orchard management and post-harvest techniques. Depending on whether the groups will be supplying the fresh or dried apricot market, shared washing, grading, packing lines or drying equipment (e.g. solar tunnels) will be provided to the clusters and located in central locations. The groups will be linked to processors and traders, as described below.

3. Support product development for processed apricots.
Apricot can be used as a flavour ingredient in processed foods such as cereal/fruit bars, yoghurts, ice-cream and cheese. Dried apricot can be packaged into small heat-sealed bags as a healthy ready-to-eat snack. Lesser quality apricot can be processed into jams and juices. Oil can be made from the discarded kernel of dried apricots. However, opportunities for product development are largely limited to improving the quality, packaging and marketing of dried apricot. Activities will include funding new product development, exposure trips to other apricot processors, training and certification in food safety and quality management systems (e.g. HAACP, ISO 22000) and gaining organic and Geographical Indication certification.

4. Promote market linkages for quality processed apricot (domestic and export).
The value-chain assessment concluded the least performing driver of the processing segment was market structure, i.e. the number of processors and number of buyers. Processors found it difficult to engage overseas buyers due to their small size and distance from market. It is proposed to establish a Gilgit-Baltistan Fruit Processor Association as a platform for promoting processed apricot products to high-value markets domestically and overseas. A marketing strategy will be developed and may include carrying out trade missions and attending trade fairs.

5. Develop cold-chain infrastructure for fresh fruit trading in Gilgit.
Gilgit is a hub for temperate fruit production in Pakistan (apricot, apple, grapes, pears, peaches, cherry, etc.) and fresh fruit commands the highest prices. Construction of the Karakoram Highway and improvements in storage and transport technologies now offers opportunities for fresh fruit from Gilgit to be sold in down-country supermarkets and exported to Dubai. A major strategic decision is whether to invest in a wholesale market or support individual traders in Gilgit. Whilst a wholesale market has the potential to benefit more stakeholders, individual traders are more likely to manage the investment sustainably.

Establishing a cold chain will firstly require providing washing, grading and packing facilities to clusters of fruit producers. A central cold store in Gilgit town will then be required to chill the fruit before transporting down-country in small refrigerated vans. Establishing fresh fruit supply chains will require considerable work establishing producer organisations and improving post-harvest skills. Consequently, this activity can only be initiated after orchard management and on-farm processing skills of fruit producers have been improved, as described above.

A tentative work plan has been developed for implementing the proposed interventions over the next three and a half years, with an estimated budget of US$1,250,000.

1.0 INTRODUCTION & OBJECTIVES

1.1 The Agribusiness Project

The Agribusiness Project is a five-year project that commenced in November 2011, funded by USAID and implemented by the Agribusiness Support Fund. The overall goal of the project is to support improved conditions for broad-based economic growth, create employment opportunities and contribute towards poverty alleviation through increased competitiveness of horticulture and livestock value chains. The objectives of the project are to:

- strengthen the capacity in horticulture and livestock value chains to increase sales to domestic and foreign markets;
- strengthen the capacity of smallholders and farmer enterprises to operate autonomously and effectively; and,
- increase agriculture efficiency and productivity through adoption of new farming techniques and technological innovation among targeted beneficiaries.

The project activities are organised into the following two components:

- Technical Assistance (TA) for Capacity Building and Programme Support
- Partnership Window Cost-Sharing Grants.

1.2 Value-Chain Analysis of the Apricot Sector

The objective of appraising the apricot sector is to recommend specific interventions for funding by the project to strengthen the entire apricot sector and support achievement of the project's overall objectives, as described above. The interventions will focus on integrating smallholder apricot producers into commercial value chains and be driven by food processing and value-addition for all apricot products.

2.0 METHODOLOGY

The methodology used during this assessment is based upon the rapid appraisal methodology developed by the Food and Agriculture Organisation as described in the manual 'Guidelines for Rapid Appraisals of Agrifood Chain Performance in Developing Countries'.[1] The appraisal maximised the use of pre-existing studies and secondary data. Information gaps were filled by a field visit to Gilgit-Baltistan, an apricot producing region in Pakistan, where interviews were held with apricot farmers, traders, processors and exporters. Further interviews were held with apricot traders in Islamabad. Documents reviewed and persons met during the course of the appraisal are presented in Annexes A and B respectively.

To evaluate value chain performance, a 'Performance Scoring Matrix' is developed based upon the major performance drivers. The six main performance drivers are: i) enabling environment, ii) technology, iii) market structure, iv) coordination, v) firm management, and vi) availability of inputs. Each 'driver' is made up of a cluster of constituting elements of 'sub-factors'. For example, the 'Enabling Environment' driver will include elements of policy, taxation, infrastructure, access to finance, trade agreements, etc. Each sub-factor is then assessed for each segment of the chain, e.g. production, processing, trading.

[1] Da Silva & Souza Filho (2007) *Agricultural Management, Marketing and Finance Occasional Paper No 20*, FAO Rome.

The relevance of each sub-factor is qualitatively evaluated by using a 'Likert' scale. The judgment ranges from 'Very Favourable', when there is a significant positive contribution of the sub-factor, to 'Very Unfavourable', when there are bottlenecks or even barriers to reach or sustain performance. Intermediate conditions are classified as 'Neutral'.

Each sub-factor is weighted with a value that indicates its capacity to influence the performance driver to which it belongs. The column 'Relevance' is multiplied by the column 'Weight' to give an overall evaluation for each performance driver. The detailed Performance Scoring Matrix for apricot is presented in Annex C. A synthesis of the matrix is presented graphically as a means of drawing main conclusions in Section 4.

3.0 BACKGROUND

3.1 The Global Context

Global apricot production is estimated at 3.8 million tonnes. Turkey is the world's largest producer, growing 676,000 tonnes of fresh apricot in 2011.[2] The majority of apricots are consumed in producing countries and approximately only 7% of production is traded (ITC).

The largest volumes of apricot exports are traded fresh. Fresh apricot exports have steadily increased by 21% from 2008 to 2011. Although France is only the world's seventh largest producer of apricots, in 2011 it exported 31% of its harvest, which is 19% of total world exports, making it the global leader. Correspondingly, fresh apricot imports have also increased. Russia is the world's leading importer, importing 24% of all fresh apricot traded (ITC).

Although worth more in value than fresh apricot, dried apricot exports have slightly decreased since 2008. As well as being the world's largest producer of apricots, Turkey is the leading exporter of dried apricots, exporting 62% of all world exports in 2011. Previously Russia was the world's largest importer; however, most recent statistics show imports more than halved in 2011. Also, Kazakhstan rose from being a minor importer to a world leader in the same year (ITC). Further detailed information on trade flows is presented in Annex D.

3.2 The Pakistan Apricot Sector

- **Production**

Pakistan produces approximately 300,000 tonnes of fresh apricot, making it the world's fourth largest producer.[3] Gilgit Baltistan (GB) and Balochistan are the two main apricot growing regions in Pakistan, with GB alone producing 114,286 tonnes in 2007. Table 1 shows area planted and production in GB by district. Planting density is only 230 trees/ha, which is much less than the recommended 750 trees/ha, due to apricots being planted around field edges, rather than orchards. Average yields of fresh fruit are 38kg/tree which are good considering the limited use of inputs, although yields of 50kg/tree can be achieved through improved management.

[2] FAOSTAT
[3] Pakistan Bureau of Statistics and Northern Area Agricultural Statistics 2007

Table 1: Apricot Production in GB (2007)

District	Area Planted (ha)	Production (MT)
Gilgit	1,201	9,169
Hunza/Nagar	1,790	21,156
Ghizer	1,475	14,491
Astore	560	2,932
Diamer	537	1,194
Skardu	4,871	40,649
Ghanche	2,487	22,723
Total	**12,921**	**114,286**

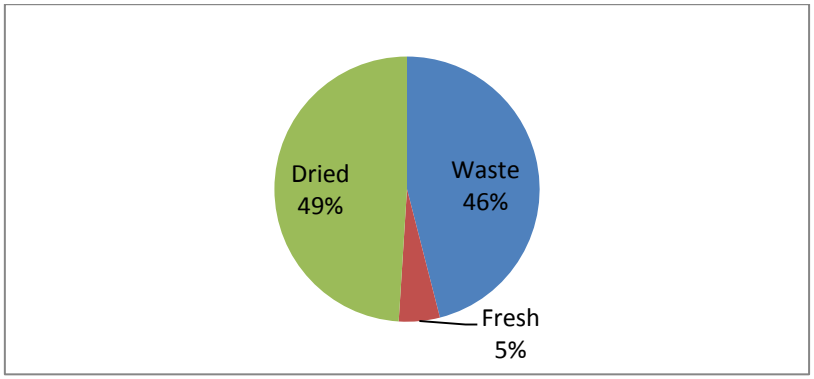
Source: Northern Areas Agriculture Statistics 2007, DoA, Gilgit

Area planted and production is highest in Skardu and Ghanche districts, whilst production is also high in Hunza/Nagar district. Astore and Diamer are the two lowest producing districts.

Figure 1 shows that 46% of the total apricot harvest is wasted, 49% are dried and 5% are eaten fresh. For both fresh and dried apricot, roughly 40% is consumed at home and 60% sold.

The structure of the apricot sector in GB reflects the previous geographical isolation from markets, prior to construction of the Karakoram Highway (KKH). Most of the apricot trees have been propagated by farmers themselves from a wide variety of naturally growing cultivars indigenous to the area. This has resulted in much of the harvest being low quality, unmarketable varieties and explains the high level of wastage. Furthermore, the limited local market meant only enough apricot was harvested to satisfy local needs, with the remainder being left to waste. Due to the seasonality of production and perishability of fresh apricot, post-harvest drying became necessary for consumption at a later date.

Figure 1: Apricot Use



Source: Northern Areas Agriculture Statistics 2007, DoA, Gilgit

- **Trade**

Exports of fresh apricot from Pakistan have decreased considerably since 2007, when significantly more apricots were exported to UK and the Middle East (Saudi Arabia, Bahrain and United Arab Emirates). In 2011, India, UK and USA accounted for 56% of exports.

Pakistan is a very small fresh apricot exporter and accounts for only 0.06% of total world exports (ITC).

Pakistan exports a larger amount of dried apricot than fresh apricot, with 51% exported to Germany, UK and India in 2011. Nonetheless, exports of dried apricot have declined by 11% since 2007. Pakistan is a very small dry apricot exporter and accounts for only 0.3% of total world exports (ITC).

Imports of fresh apricot to Pakistan originate almost exclusively from Afghanistan. In 2011, imports totalled 5,351 tons (ITC). Afghan apricots are imported through Peshawar and often re-exported overland to India.

3.3 The GB Apricot Supply Chain

GB is geographically isolated, the population small and dispersed, the terrain harsh and weather conditions variable. Due to the mountainous terrain only 2% is cultivable, of which about 1% is currently farmed. The remainder is left barren due to lack of irrigation. The average landholding in GB is approximately 0.75ha per household.

On average 41% of household income is sourced on-farm with 59% sourced off-farm through small business, seasonal labour or professional employment.[4] Agricultural production is mostly subsistence and only a small amount is marketed. In 2008, per capita income averaged PKR29, 426, or just 49% of the national average.[5]

Wheat, maize and barley are important food crops with the majority being used for home consumption. Fruit, nuts and vegetables such as potato are consumed and also sold to generate cash income. Apricots are the most common fruit grown with an average 15 trees per household. In Ghanche and Skardu districts, apricot sales account for over 70% of on-farm income. Further detailed information on the agricultural and socio-economic conditions of GB is presented in Annex D.

3.3.1 Spatial and volume commodity flows

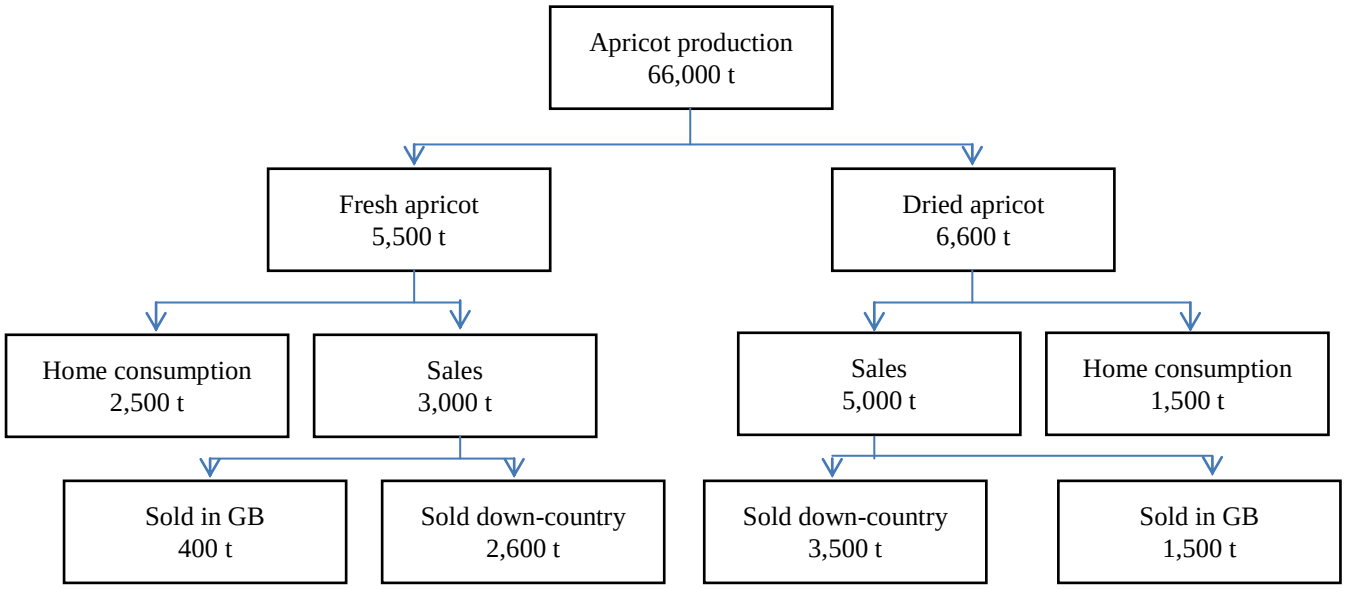
Figure 2 shows a volumetric chain map for GB apricots. Only 8% of apricot produced is eaten fresh, nearly half as home consumption. Three thousand tonnes enter the market, 87% of which is sold down-country with only 400t being sold locally.

For 60,500 tonnes of fresh apricots processed, 6,600 tonnes of dry apricot are produced. Twenty-three per cent is kept for home consumption and 5,000 tonnes are sold on to the market. Thirty per cent is sold locally in GB with 3,500 tonnes being sold down-country.

As most households have apricot trees themselves, the local market is very limited. Of the dried apricot sold down-country, roughly 70% is sold in Rawalpindi.

[4] SESNAC AKRSP, 2007
[5] SESGBC, 2008

Figure 2: Volumetric Chain Map of GB Apricots



Source: Based upon: Apex (2010) *Commercial Potential of GB Apricot*, SDC

A spatial chain map for all apricot in Pakistan is shown in Figure 3. Main production centres are Gilgit in the north and Balochistan in the south. The largest consumption centre is Karachi (11.1 million population), although the Punjab cluster of Lahore, Faisalabad, Rawalpindi and Islamabad has a combined population of 12.1 million. As such, the Gilgit apricots supply the Punjab market, and the Balochistan apricots supply the Karachi market.

Gilgit apricots are competing with fresh apricots imported from Afghanistan, via Peshawar, some of which are re-exported overland to India. Dried apricots exported to Europe mostly originate from Balochistan and are shipped from Karachi.

Figure 3: Spatial Chain Map for Apricots in Pakistan

Legend

Apricot consumption centres

Apricot production areas

Domestic apricot trade routes

Apricot imports

Apricot exports

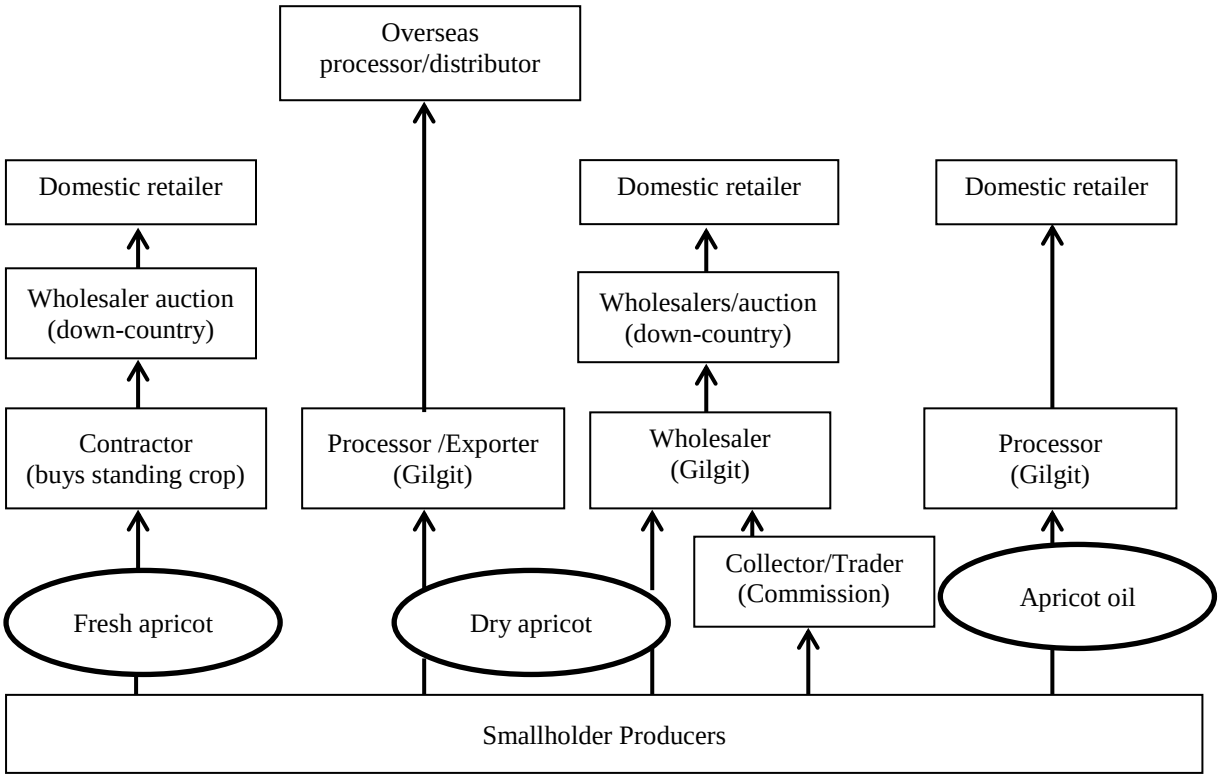
3.3.2 Institutional commodity flows

Figure 4 shows the institutional chain map for GB apricots. Production is carried out by smallholder producers who also carry out the drying process. The majority of the harvest is dried and sold down-country through auctions. Apricots are bought at farm-gate by collectors/traders or delivered to wholesalers based in Gilgit. The wholesalers in Gilgit usually operate a retail store in the market and trade in several agri-food products, e.g. apricot, cherry, walnut and almond. The Gilgit wholesaler carries out some cleaning and sorting and bag the dried apricot into 50kg hessian bags for transport down-country and sale to wholesalers or through auction markets in other regions.

There are a few small processors in Gilgit who carry out additional transformation of the dried apricot into a high-value product for export. Dried apricots are bought direct from farmers, then cleaned and graded. The apricot is packed in Gilgit, transported overland to Karachi and shipped in a container via Felixstowe to buyers in UK. Apricot oil processors also buy the discarded kernel from farmers, extract the oil and package it for sale to customers down-country.

Fresh apricot is often bought as a standing crop by a down-country 'contractor'. The contractor pays a lump sum to the farmer and then organises the harvest, packing and transport of the apricot to auction markets down-country.

Figure 4: Institutional Chain Map of GB Apricots



Further detailed information on the GB apricot supply chain is presented in Annex D.

4.0 APRICOT SECTOR PERFORMANCE EVALUATION

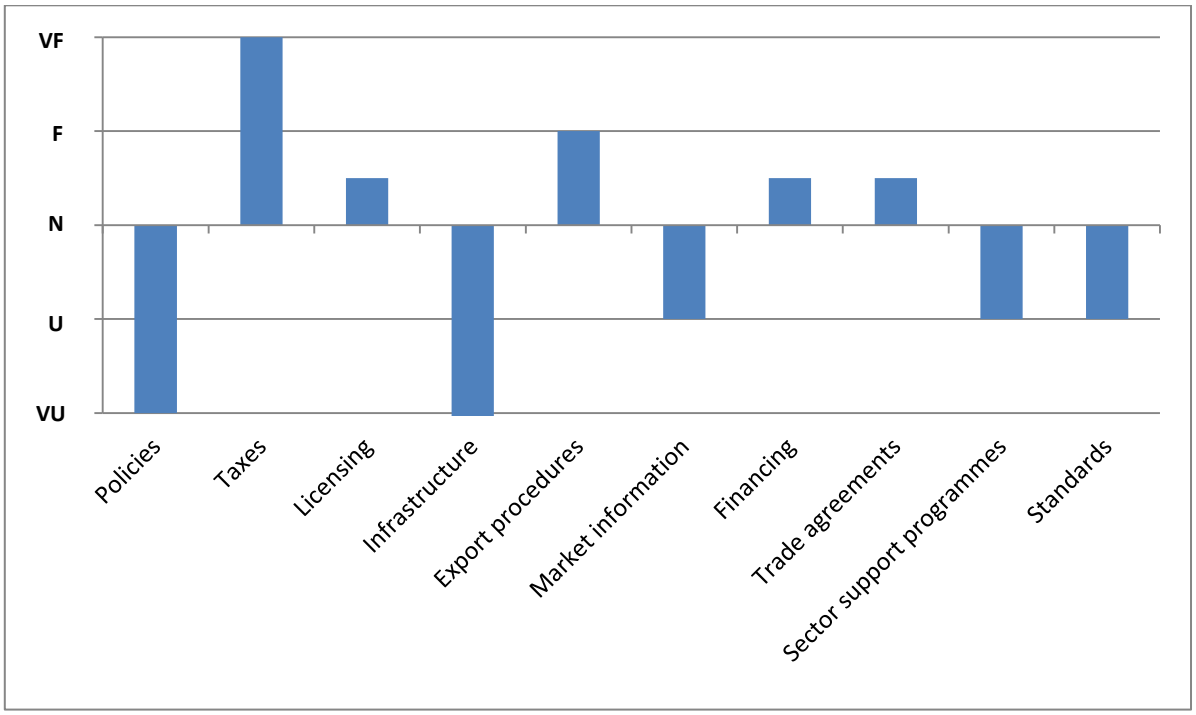
The following 'Likert' graphs are based on the 'Scoring Matrix' found in Annex C. Each 'driver' has been given a rating between Very Favourable (VF) to Very Unfavourable (VU)[6]. Five graphs have been produced. The enabling environment graph applies to all segments of the apricot chain. Individual graphs have been prepared for the production, processing and trading segments. Finally, a summary graph is presented indicating overall performance of the apricot chain. Detailed information to support the performance ratings are found in Annex D.

The graphs are supported by tables which provide additional detail on the sub-factors for each driver. The 'controllability' columns indicate which stakeholder in the chain has control over each sub-factor and therefore should be targeted to improve performance.

4.1 Enabling Environment

Figure 5 indicates that overall, the business environment has a mixed enabling affect upon performance of the apricot sector.

Figure 5: Performance Enabling Environment



The regional Government of GB has no agricultural policy and only a draft horticulture policy. The DoA receives very little funding from the Annual Development Plan, hence sector support programmes are dependent upon donor assistance. Therefore, policies and sector support programmes are rated very unfavourable and unfavourable respectively.

The regulatory framework is favourable for private sector development. No company or personal income taxes are levied in GB; trading or export licenses are not required and export

[6] VF – Very Favourable, F – Favourable, N – Neutral, U – Unfavourable, VU – Very Unfavourable.

procedures are reasonably straight forward. Investment and working capital loans are available from the formal banking sector; therefore, the financing sub-factor is also rated favourable.

Infrastructure is rated very unfavourable. Although the KKH has provided access to markets in China and down-country Pakistan, trade volumes remain much less than expected. The KKH is closed for three months during winter and suffers temporary closures from landslides. When open, the journey from Gilgit to Islamabad can take up to four days, which is not ideal for perishables such as apricot. Air transport is more unreliable due to frequent inclement weather and plane cancellations.

Electricity is generated by hydro-power in GB. Demand is more than supply, resulting in frequent load-shedding, which affects the capacity of processors using electric powered machinery such as driers.

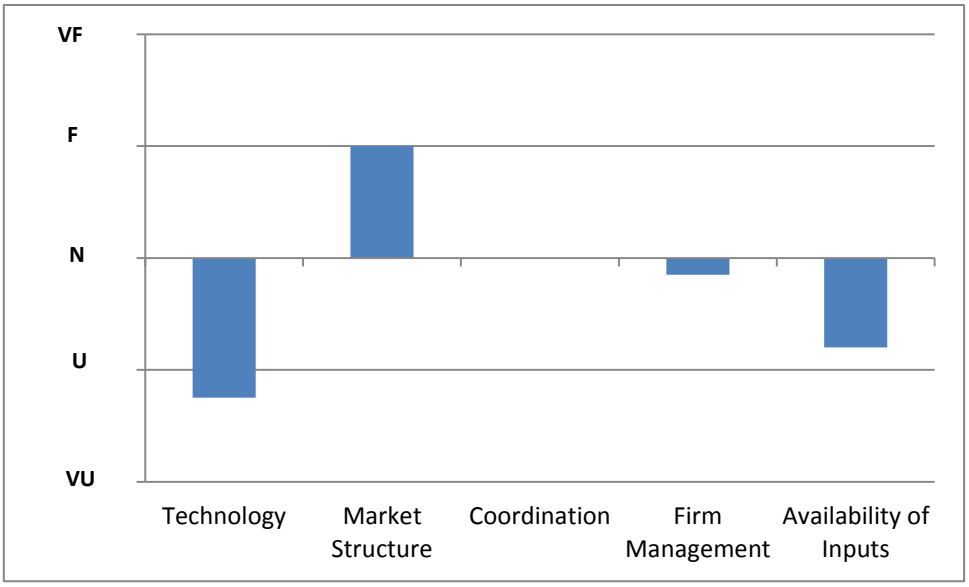
Pakistan has negotiated trade agreements with South Asia Free Trade Area (SAFTA) and China, therefore this sub-factor is rated favourable. Free Trade Agreements (FTA) with other major apricot importers, such as Europe, Russia or the Middle-East have yet to be brokered.

Market related sub-factors, such as market information and standards, are rated unfavourable. There are no formal quality standards for apricot and very little market information available in Gilgit. Due to the distance from final consumer markets, producers and local traders are unaware of consumer needs and traders continue supplying poor quality and low-value apricots to auction markets down-country.

4.2 Production Segment

Figure 6 shows that overall performance of the production segment is negative. Although market structure and coordination drivers are rated favourable and neutral respectively; technology, firm management and availability of inputs drivers are all negative. Further details on contributing sub-factors for each driver are described below.

Figure 6: Producer Segment Performance



- **Technology**

Table 2 rates the cultivar development sub-factor as very unfavourable. Most apricots cultivated by farmers originate from a wide variety of naturally growing cultivars indigenous to the area. Local cultivars typically have a high sugar and moisture content causing a short shelf-life. Fruit quickly deteriorates after picking and bruises easily during transport. Consequently, local varieties are not suitable for the fresh apricot market.

MARC is tasked with carrying out research and varietal trials and there are several DoA and private fruit tree nurseries in every district. Budding, grafting and seedling propagation skills are good; therefore, the seedling propagation sub-factor is rated favourable. The major constraint is that research and development has focused on identifying higher performing local varieties and the promotion of improved cultivation practices, rather than adaptive research on new commercial varieties, particularly for the fresh apricot market. Therefore, the research and development sub-factor is rated unfavourable.

There are few apricot orchards and trees are usually planted around field boundaries, resulting in small amounts of production spread over a large area. Pruning is not carried out and no inputs such as sprays and fertilisers are applied. Lack of orchard management results in the production of misshapen, undersized fruit; often blemished by pest and disease and contributes towards the high levels of wasted apricot (46%). Therefore the orchard management skills sub-factor is rated very unfavourable. Due to the lack of pruning, trees are overgrown and difficult to harvest. Fruit has to be 'knocked' off the tree causing bruising; therefore, the harvest techniques sub-factor is rated unfavourable.

Due to the rapid deterioration and short shelf-life of the apricot after harvest, coupled with the distance from market, primary processing of the apricot is undertaken on-farm. Apricot is typically dried in the open and the kernel removed. Contamination with dust and dirt during drying and storage is common; hence, processing and storage sub-factors are also rated unfavourable.

The DoA receives a very small proportion of the Annual Development Plan budget; consequently, 'extension services and training' to improve orchard management by farmers is limited and this sub-factor is rated very unfavourable.

Table 2: Production – technology driver

Drivers & sub-factors	Controllability[7]				Relevance[8]	Weight
Technology	*CF*	*CG*	*QC*	*NC*		
Cultivar development			●		VU	0.1
Seedling propagation			●		F	0.1
Orchard management			●		VU	0.2
Harvest techniques			●		U	0.1
On-farm primary processing			●		U	0.1
On-farm storage			●		U	0.15
Extension services / training		●			VU	0.15
Research & development			●		U	0.1

[7] CF – Controlled by firm; CG – Controlled by Government; QC – Quasi controllable; NC – Non-controllable.
[8] VF – Very Favourable, F – Favourable, N – Neutral, U – Unfavourable, VU – Very Unfavourable.

- **Market Structure**

Overall, market structure is favourable for producers. There are over 100,000 apricot farmers and roughly 50 apricot traders and wholesalers, providing a ratio of 2,000 farmers to one buyer, ensuring a reasonable level of competition. Therefore, the number of producers and buyers sub-factors is rated very favourable and favourable respectively in Table 3.

Most households in Gilgit grow apricot, and beyond access to land and finance, there are few barriers to entry for producing apricot. Therefore this sub-factor is rated neutral.

Table 3: Production – market structure driver

Drivers & sub-factors	Controllability				Relevance	Weight
Market Structure	*CF*	*CG*	*QC*	*NC*		
Number of producers				●	VF	0.3
Number of buyers				●	F	0.4
Barriers to entry		●			N	0.3

- **Coordination**

The large number of farmers, producing small amounts of apricot necessitates some form of organisation to supply markets. Farmer groups have been established and extended families traditionally market their apricots together. Therefore, horizontal integration between farmers is good and the producer group sub-factor in Table 4 is rated favourable.

Beyond bulking produce for sale, the groups do not offer any other services as they are not linked to a larger association that could provide loans, training, marketing, etc. Therefore the effectiveness of groups sub-factor is rated neutral. The groups also do not have any long-term supply agreements with buyers, for that reason this sub-factor is rated as unfavourable.

Table 4: Production – coordination driver

Drivers & sub-factors	Controllability				Relevance	Weight
Coordination	*CF*	*CG*	*QC*	*NC*		
Presence of producer groups in production areas			●		F	0.3
Effectiveness of services provided by producer groups	●				N	0.4
Use of long-term binding agreements with buyers	●				U	0.3

- **Farm Management**

Farm size is very small and production is firstly oriented towards food crop production, e.g. wheat and maize, for home consumption. Due to the previous isolation from markets, cash incomes are mostly sourced off-farm. This has resulted in a lack of motivation and innovation for commercial agricultural production and these sub-factors are rated very unfavourable in Table 5. Apricots are not viewed as a highly profitable cash crop and little attention is paid to monitoring or controlling quality; therefore, this sub-factor is rated unfavourable.

Due to the small-scale of production, planning and leading sub-factors are rated favourable. Labour is provided by family members and little organisation is required; therefore, staffing and organising sub-factors are rated neutral.

Table 5: Production – firm management driver

Drivers & sub-factors	Controllability				Relevance	Weight
Firm Management	*CF*	*CG*	*QC*	*NC*		
Planning	●				F	0.25
Organising	●				N	0.25
Staffing	●				N	0.1
Leading / directing	●				F	0.1
Controlling / monitoring	●				U	0.1
Motivation	●				VU	0.1
Innovation	●				VU	0.1

- **Availability of Inputs**

As described above, certified seedlings of improved cultivars are not available in GB; therefore, this sub-factor is rated very unfavourable in Table 6. Due to extreme terrain and climate only 2% of land in GB is cultivatable and apricot is often planted on marginal land; therefore, the land sub-factor is rated very unfavourable. Apricot requires irrigation and only half the cultivable area is actually cultivated due to lack of irrigation, hence this sub-factor is rated unfavourable.

Although farmers do not use sprays and fertilisers for apricot production, these inputs are available; therefore, this sub-factor is rated favourable. Similarly, the labour sub-factor is rated favourable, even though farmers rely on family labour for apricot production.

There are no cold storage facilities in GB, a constraint for marketing fresh apricot. Therefore, this sub-factor is rated unfavourable. Agricultural loans are available from the formal banking sector or several micro-finance institutions; therefore, the finance sub-factor is rated favourable.

Table 6: Production – availability of inputs driver

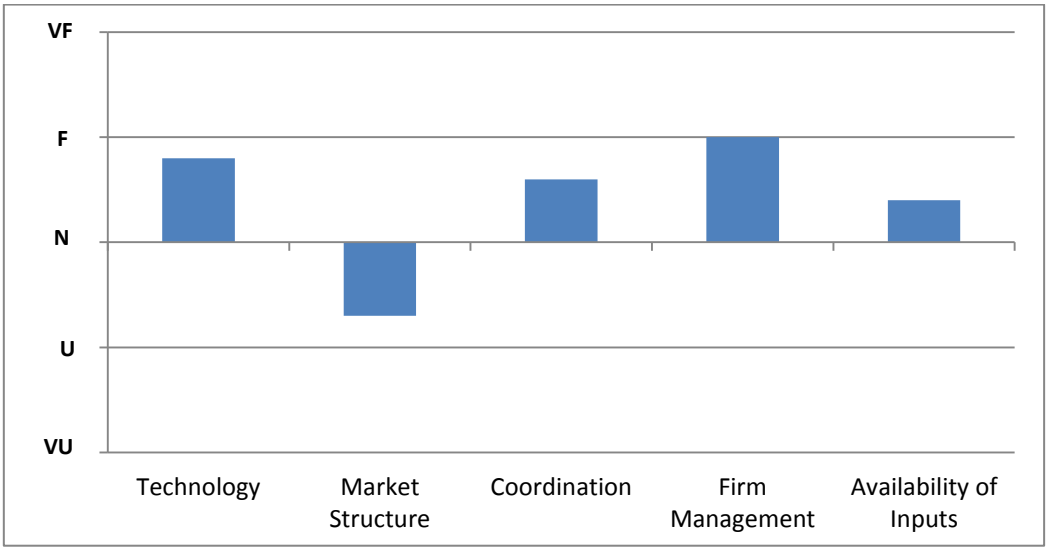
Drivers & sub-factors	Controllability				Relevance	Weight
Availability of Inputs	*CF*	*CG*	*QC*	*NC*		
Seedlings			●		VU	0.2
Sprays & fertilisers			●		F	0.1
Irrigation	●				U	0.15
Land				●	VU	0.2
Storage	●				U	0.15
Labour				●	F	0.1
Finance			●		F	0.1

4.3 Processing Segment

The processing segment refers to entrepreneurs who carry out supplementary processing, for further value addition. These products are often exported to higher value markets overseas.

Figure 7 shows that overall, performance of the processing segment is positive. All drivers are favourable except market structure as there are so few processors and buyers for value-added apricot products. Further details on contributing sub-factors for each driver are described below.

Figure 7: Processor Segment Performance



- **Technology**

Processing, packaging and storage technologies are all rated favourable in Table 7. Improved technologies for drying using sulphur, solar tunnels or electrical driers are available. Pulping machinery for juices and cold-presses for oil are available. Packaging technologies such as tetrapack, heat-sealed bags and vacuum packs are available.

Although processing, packaging and storage technologies are obtainable in Pakistan, there are very few entrepreneurs investing in the technologies to develop new value-added apricot products in GB. Furthermore, no research and development for processed apricot products is carried out in Pakistan; therefore, this sub-factor is rated unfavourable.

Table 7: Processing – technology driver

Drivers & sub-factors	Controllability				Relevance	Weight
Technology	*CF*	*CG*	*QC*	*NC*		
2.2 Processing (off-farm)						
Processing technology			●		F	0.3
Packaging			●		F	0.2
Storage technology			●		F	0.3
Research & development			●		U	0.2

- **Market Structure**

Market structure is the only processing driver to be rated unfavourable. Table 8 shows the number of processors and number of buyers sub-factors are both rated unfavourable.

Most processors seek markets overseas as it is perceived the domestic market in Pakistan will not pay price premiums for processed apricot products. Overseas buyers do not have a presence in GB; therefore making market linkages is heavily reliant on the tenacity of the individual processor/exporter. As there are few buyers, there are few processors and as there are few processors, there are few buyers, creating an unfavourable market structure.

Beyond market linkages and investment capital there are few barriers to entry; therefore, this sub-factor is rated neutral.

Table 8: Processing – market structure driver

Drivers & sub-factors	Controllability				Relevance	Weight
Market Structure	*CF*	*CG*	*QC*	*NC*		
Number of processors				●	U	0.3
Number of buyers				●	U	0.4
Barriers to entry		●			N	0.3

- **Coordination**

Due to the lack of overseas buyers, processors compete for customers and there is no collaboration, or horizontal integration, between processors to fulfil larger orders and access bigger markets. Therefore this sub-factor is rated unfavourable in Table 9. However, processors do have agreements with suppliers and buyers, therefore these sub-factors are rated favourable.

Table 9: Processing – coordination driver

Drivers & sub-factors	Controllability				Relevance	Weight
Coordination	*CF*	*CG*	*QC*	*NC*		
Collaboration between processors to access markets	●				U	0.2
Use of contracts or binding agreements with suppliers	●				F	0.4
Use of contracts or binding agreements with buyers	●				F	0.4

- **Firm Management**

The processors are entrepreneurs, most of whom are educated, and operate other established businesses. As such they possess good management skills and all sub-factors are rated favourable in Table 10.

Table 10: Processing – firm management driver

Drivers & sub-factors	Controllability				Relevance	Weight
Firm Management	*CF*	*CG*	*QC*	*NC*		
Planning	●				F	0.3
Organising	●				F	0.3
Staffing	●				F	0.05
Leading / directing	●				F	0.05
Controlling / monitoring	●				F	0.1
Motivation	●				F	0.1
Innovation	●				F	0.1

- **Availability of Inputs**

Apricots are widely available in GB and it is estimated 46% of production is not utilised; therefore, the availability of raw materials sub-factor is rated favourable in Table 11. Processing machinery, labour and finance are also available; therefore, these sub-factors are likewise rated favourable.

Packaging and storage technologies for dried processed apricot are available in GB; therefore, these sub-factors are rated favourable. However, reliable electricity supply is a big constraint due to load shedding and this sub-factor is rated very unfavourable.

Table 11: Processing – availability of inputs driver

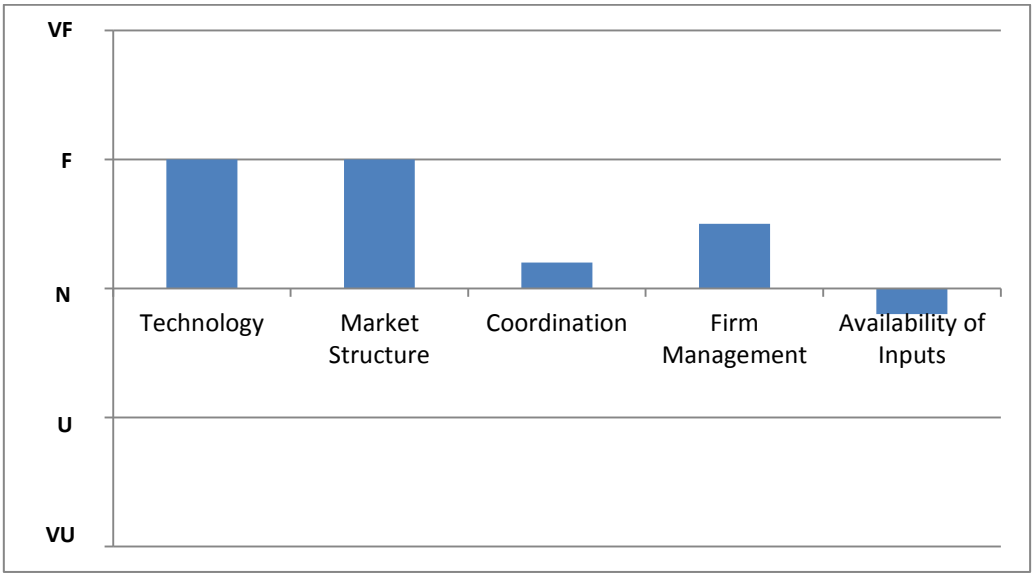
Drivers & sub-factors	Controllability				Relevance	Weight
Availability of Inputs	*CF*	*CG*	*QC*	*NC*		
Raw materials - apricots				●	F	0.2
Machinery	●				F	0.2
Power / electricity		●			VU	0.2
Packaging	●				F	0.1
Storage	●				F	0.1
Labour				●	F	0.1
Finance			●		F	0.1

4.4 Trading Segment

The trading segment refers to the traditional wholesale traders who carry out the bulking and transport functions, buying dried apricot in Gilgit and selling to wholesalers and auction markets down-country. This segment also includes fresh apricot bought as a standing crop from farmers.

Figure 8 shows that overall, performance of the trading segment is positive, with the exception of the availability of inputs driver. Further details on contributing sub-factors for each driver are described below.

Figure 8: Trader Segment Performance



- **Technology**

The handling and storage of dried apricot is adequate and cold storage technologies are available in Pakistan, even though there are no facilities in GB. Therefore, this sub-factor is rated favourable in Table 12. Air travel is unreliable and the KKH to Islamabad suffers temporary closures. However, small refrigerated vans can make the journey in 14 hours, much quicker than the large trucks used by haulage companies. Therefore, the transport sub-factor is rated favourable. Due to the extensive mobile phone network, the communication sub-factor is rated very favourable.

Table 12: Trading – technology driver

Drivers & sub-factors	Controllability				Relevance	Weight
Technology	*CF*	*CG*	*QC*	*NC*		
Handling & storage			●		F	0.3
Communication			●		F	0.3
Transport			●		F	0.4

- **Market Structure**

Table 13 shows the market structure for trading is favourable. There are numerous buyers and sellers creating a competitive market environment. A license is not required for small-scale trading and beyond access to finance, there are no barriers to entry.

Table 13: Trading – market structure driver

Drivers & sub-factors	Controllability				Relevance	Weight
Market Structure	*CF*	*CG*	*QC*	*NC*		
Number of traders				●	F	0.3
Number of buyers				●	F	0.4
Barriers to entry		●			F	0.3

- **Coordination**

Whilst there is little horizontal coordination between competing wholesalers, there is a certain amount of vertical coordination in the supply chain. For example, Gilgit wholesalers will advance cash to smaller traders to source apricot. There is also coordination between wholesalers in Gilgit supplying apricot to wholesalers down-country, who in return may supply the Gilgit wholesalers with products to sell up-country, such as walnuts in China. Therefore, the collaboration sub-factor is rated favourable in Table 14.

Traders do not have any long-term binding agreements with suppliers or buyers. All orders are one-off transactions, therefore the supplier/buyer contract sub-factors are rated neutral.

Table 14: Trading – coordination driver

Drivers & sub-factors	Controllability				Relevance	Weight
Coordination	*CF*	*CG*	*QC*	*NC*		
Collaboration between traders to access markets	●				F	0.2
Use of contracts or binding agreements with suppliers	●				N	0.4
Use of contracts or binding agreements with buyers	●				N	0.4

- **Firm Management**

Traditional traders typically strive to achieve the highest margins by buying at the lowest price and selling at the highest price. Very little attention is paid to product differentiation and quality aspects to achieve price premiums; therefore, the innovation sub-factor is rated unfavourable in Table 15. Due to the lack of long-term contracts with suppliers and buyers, as described above, the planning sub-factor is rated neutral. However, other aspects of firm management, such as organising, staffing, leadership, monitoring and motivation sub-factors are all rated favourable.

Table 15: Trading – firm management driver

Drivers & sub-factors	Controllability				Relevance	Weight
Firm Management	*CF*	*CG*	*QC*	*NC*		
Planning	●				N	0.3
Organising	●				F	0.3
Staffing	●				F	0.05
Leading / directing	●				F	0.05
Controlling / monitoring	●				F	0.1
Motivation	●				F	0.1
Innovation	●				U	0.1

- **Availability of Inputs**

Apricots are widely available, mobile phone and internet services are easily obtainable, labour is available on a permanent and seasonable basis and finance services are provided by both formal and informal banking institutions. Therefore, these sub-factors are all rated favourable.

Even though packaging materials and cold storage technologies for fresh fruit are obtainable down-country, they are not available in GB. This is preventing development of the fresh fruit market; therefore, these sub-factors are rated very unfavourable in Table 16. Small refrigerated vans used for transporting ice-cream are also suitable for the rapid transport of fresh fruit, but not used by traders in GB; therefore, the transport sub-factor is also rated very unfavourable.

Table 16: Trading – availability of inputs driver

Drivers & sub-factors	Controllability				Relevance	Weight
Availability of Inputs	*CF*	*CG*	*QC*	*NC*		
Product - apricots				●	F	0.3
Packaging	●				VU	0.1
Storage	●				VU	0.1
Transport			●		VU	0.2
Information & communication technology	●				F	0.1
Labour				●	F	0.1
Finance			●		F	0.1

4.5 Summary Performance Evaluation

The Enabling Environment graph in Figure 5 indicates improvements are necessary in agricultural policy to guide public and private investment and sector support programmes to develop the temperate fruit industry in GB. Improvements are also necessary with the provision of up to date and useful market information to inform producers, processors and traders what types of apricot products consumers want and what they are willing to pay more for. When striving to meet market requirements, the use of 'standards' is an effective means of improving quality.

A performance summary of the apricot sector is presented in Figure 9. The majority of drivers are positive. Nonetheless, the graph highlights the areas where most improvement is needed.

Figure 9: Summary Apricot Sector Performance

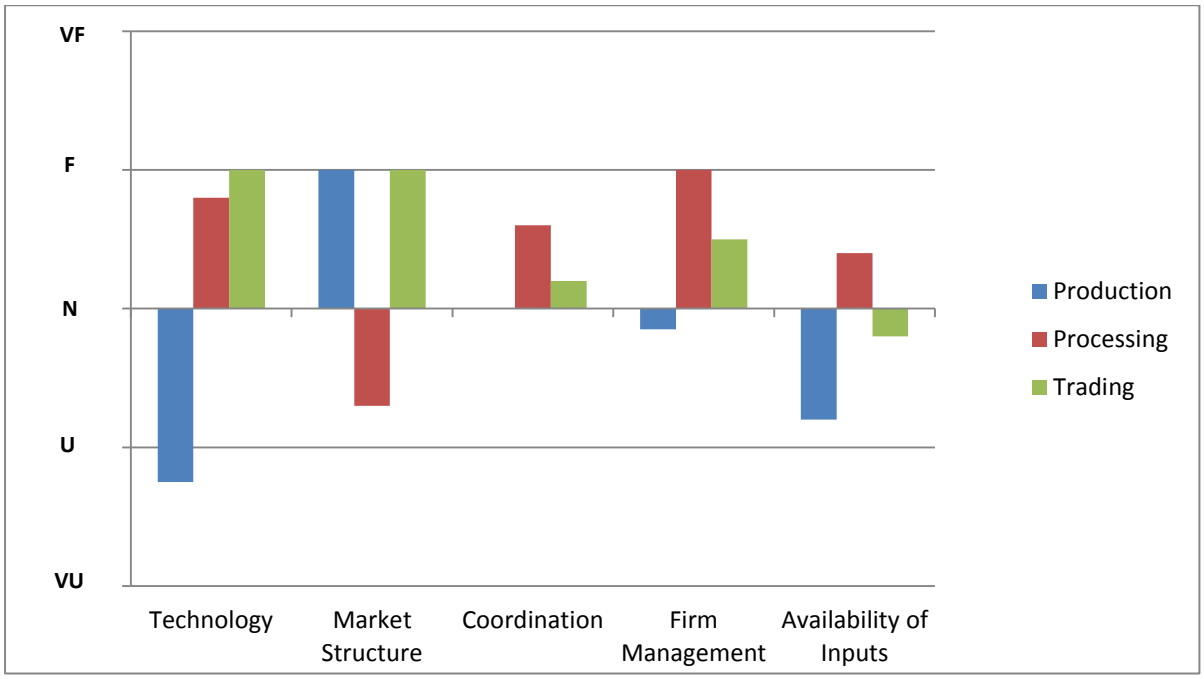


Figure 9 confirms the biggest constraint to performance of the apricot sector is the technology driver for the production segment. The introduction of commercial cultivars, suitable for the fresh fruit market, with good transportation characteristics is fundamental to development of the sector. Other factors such as orchard management and post-harvest practices must also be addressed.

The market structure driver is the biggest constraint to performance of the processing segment. Most processors seek markets overseas and making market linkages is heavily reliant on the tenacity of the individual processor/exporter. As there are few buyers, there are few processors and as there are few processors, there are few buyers, creating an unfavourable market structure. If the processing segment is to grow, a diversification strategy is necessary to develop new products and new markets.

The availability of inputs driver is negative for both production and trading segments. If down-country trade in higher-value fresh apricots is to develop, facilities for packing, cold storage and refrigerated transport will be necessary. As GB is a hub for temperate fruit in Pakistan, such infrastructure has the potential to benefit the whole horticulture sector, not just apricot.

5.0 RECOMMENDATIONS

5a) Introduce, propagate and distribute improved commercial cultivars

Rationale & proposed strategy:

Most apricot varieties cultivated by farmers originate from a wide variety of naturally growing cultivars indigenous to the area. Up to 46% of the crop is wasted as the fruit is low quality and unmarketable. Local cultivars typically have a high sugar and moisture content causing a short shelf-life. Fruit quickly deteriorates after picking and bruises easily during transport. Consequently, local varieties are not suitable for the fresh apricot market.

In partnership with MARC, it is proposed to firstly identify potential commercial varieties that are suitable for drying and supplying the fresh market and develop a strategy for quickly distributing improved seedlings amongst farmers. This may include developing a clonal garden with MARC that can provide improved budding and grafting material for distribution amongst DoA and private nurseries. The nurseries will then propagate improved seedlings for distribution to farmers in the medium term.

To expedite the process in the short-term, it is recommended budding is carried out directly on the existing trees of target farmers who are members of FEGs.

Potential impact:

Six-hundred farmers will be directly targeted by the project and provided with improved planting materials. It is expected wastage will be reduced from 46% to 10%, representing a 34% increase in sales. Based upon calculations in Table 14, this would increase farm household incomes by US$29/year. There will also be multiplier income effects on other chain stakeholders such as processors and traders.

Once established, the nurseries will supply all apricot farmers in the region with improved seedling as indirect beneficiaries, creating widespread impact in the long-term.

Source of finance	Priority:
Research & development grant	Short-term (over next 12 months)
Estimated Cost:	
US$50,000	

Further Study Required

- Identify suitable cultivars.
- Develop strategy for quickly distributing improved seedlings amongst farmers.

5b) Improve orchard management and on-farm processing skills of apricot producers

Rationale & proposed strategy:

Due to GBs previous isolation, farming systems are typically subsistence oriented. Apricot production is carried out around field edges and no inputs are used or pruning carried out. Traditional on-farm drying is unhygienic producing a low quality and low value product.

To implement the supply chain improvements described in the other recommendations described below, several major changes must be made in the production segment, in addition to introducing improved varieties. These include:

i) establishing apricot orchards and apricot producer groups that can collectively produce a collateral mass of apricot to attract buyers and qualify investment in shared infrastructure,
ii) improving irrigation in apricot orchards, e.g. drip irrigation schemes,
iii) training on pruning, fertiliser use and pest/disease management,
iv) training on improved harvesting to reduce bruising and extend shelf-life for fresh apricot,
v) provision of solar drying tunnels and training in sulphuring technique for dried apricots, and

vi) provision of washing, grading & packing facilities for fresh apricots. Systems will also have to be put in place to manage the shared infrastructure and facilitate supply chain linkages to processors and traders.

Potential impact:
Forty FEGs will be established with a total of 600 members. In addition to the increased income from reduced wastage, as described above in 5a), farmers will receive a higher price for producing better quality dried and fresh apricot. High quality dried apricot can receive a 20% premium on poor quality. Based upon calculations in Table 14 and including increased volumes from reduced wastage, farm household income will increase by a total US$43/year. There will also be multiplier income effects on other chain stakeholders such as processors and traders.

Source of finance	Priority:
FEG support grants Support to FEG clusters and farmer associations Support to individual farmers Agriculture extension services grant Estimated Cost: US$420,000	Medium-term (over next 18 months)

Further Study Required
- Identify clusters of target apricot FEGs.

5c) Support product development for processed apricots

Rationale & proposed strategy:
Most GB apricot is dried on-farm and sold through wholesalers and auction markets down-country as a low-quality undifferentiated product fetching low prices. A few entrepreneurs have developed new products, such as apricot oil from the kernel discarded during the drying process, or high quality dried apricot for export overseas.

Apricot can be used as a flavour ingredient in processed foods such as cereal/fruit bars, yoghurts, ice-cream and cheese. Dried apricot can be packaged into small heat-sealed bags as a healthy ready-to-eat snack. Poor quality apricot can be processed into jams and juices.

Apricot oil is a niche product and without any unique qualities has to compete with the myriad other oils available on the market. The preparation of apricot into cereal/fruit bars and yogurt etc. is usually undertaken by processors in the consuming country. Pulping fresh apricot into juices is usually a means of using waste from the fresh apricot industry. As such, prices paid for the waste apricot are very low. However, there may be opportunities to produce apricot jam. Opportunities for product development are largely limited to improving the quality, packaging and marketing of dried apricot and seeking new markets for the dried apricot, which is covered under 5d) below. Meeting international standards is important for the export market and many processor/exporters have suffered difficulties meeting SPS requirements and quality standards demanded by buyers.

Quality improvement is the basis for increasing the value of dried apricot and requires training farmers in improved post-harvest practices. The 'Mountain Fresh' business model is a good example of how dedicated supply chains can be established with farmer groups. Apricot is viewed as a health food; therefore, organic certification has some potential to add value. Certification for 'Geographical Indication' (GI) may also add value as 'Hunza' apricots are well known in Pakistan. GI can be used on products that have a specific geographic origin and possess qualities or a reputation that are intrinsically due to that place of origin.

It is proposed the Project funds new product development with a core group of processors in conjunction with market linkage activities described under 5d). The Project would fund:
i) machinery, equipment and training required for developing new products,

ii) exposure trips to other apricot processors, iii) training and certification in food safety and quality management systems (e.g. HAACP, ISO 22000) and iv) organic and GI certification costs.
Potential impact: The Project will target 20 processors. Based on calculations in Table 15, gross margins will be increased from PKR5/kg to PKR10/kg for improved processed products. If an average processor produces 50 tonnes/year, this represents an increase in income of US$2,632/year per processor.

Source of finance	Priority:
Enterprise development grant Estimated Cost: US$260,000	Medium-term (over next 24 months)

Further Study Required

- Identify target group of 20 processors.
- Scoping survey to identify new products and potential buyers (in conjunction with 7d)

5d) Promote market linkages for quality processed apricot (domestic and export)

Rationale & proposed strategy:

The value-chain assessment that showed the biggest weakness of the processing segment was market structure, i.e. the number of processors and number of buyers. Processors found it difficult to engage overseas buyers due to their small size and distance from market.

It is proposed a Fruit Processor Association is established as a platform for promoting GB processed apricot products overseas and domestically. Through increased collaboration between processors, larger orders will be achieved and several products will be made available through one portal. Marketing and promotion costs will be shared across the association and Gilgit fruit products will be marketed as a brand.

Potential market linkages include: i) overseas processors using apricot as an ingredient for cereal/fruit bars, cheese, yoghurt, ice-cream, jams etc. ii) chains of health food shops, and iii) foreign and domestic supermarkets / convenience stores selling ready-to-eat dried apricots.

The Project will fund establishment costs of the association and support development and implementation of a marketing strategy. This may include carrying out trade missions and attending trade fairs.

Potential impact:

The project will target 20 processors. If average sales/processor is doubled from 50 tonnes/year to 100 tonnes/year and price/kg is doubled as described under 5c) above, total income is increased by US$7,895/year for each processor.

The Association will be open to all fruit processors in GB, and therefore has the potential for widespread impact in the long-term.

Source of finance	Priority:
Support to business associations Estimated Cost: US$160,000	Long-term (over next 30 months)

Further Study Required

- Identify new buyers overseas.
- Identify high-value domestic buyers and distributors.
- Consultation with processors to assess interest in establishing a Fruit Processor Association.
- Scoping survey to identify products in demand from potential buyers (in conjunction with 5c)

5e) Develop cold-chain infrastructure for fresh fruit trading in Gilgit

Rationale & proposed strategy:

Gilgit is a hub for temperate fruit production in Pakistan (apricot, apple, grapes, pears, peaches, cherry etc.) and fresh fruit commands premium prices. Apricots have traditionally been dried in GB due to the previous isolation from markets. However, after construction of the KKH and improvements in storage and transport technologies, the marketing of fresh fruit from Gilgit to down-country Pakistan and overseas is now a possibility. Developing cold storage and refrigerated transport infrastructure would produce benefits for all fresh fruits, not just apricot, and also off-season vegetables.

Local apricot varieties have a high Brix Value (sugar content), rendering them unsuitable for long distance transport, due to short shelf life. Therefore, commercial apricot varieties suited for transport with a long shelf-life, must first be introduced, as described in 5a) above. Potential high-value markets must also be identified. For example, there are regular air links to Dubai from Islamabad. Opportunities for supplying large fresh apricot retailers in major cities can also be explored, e.g. Metro.

A major strategic decision is whether to invest in a wholesale market or support individual traders in Gilgit. Whilst a wholesale market has the potential to benefit more stakeholders, individual traders are more likely to manage the investment sustainably. This decision needs to be made by the Project through discussions with traders and potential wholesale market managers, e.g. local Government in Gilgit or an association of fruit traders.

The FEG clusters will need to be provided with washing, grading and packaging facilities. Suitable protective packaging materials for fresh produce must also be introduced. These centralised facilities will require management by a producer association and charges made for cost recovery.

A central cold store in Gilgit town is necessary to chill the fruit down to 0.5°C before transport down-country. Apricot can be kept in cold storage for up to three weeks. Small refrigerated vans used by Nestlé to bring ice-cream to Gilgit have proved effective, as they can make the journey from Islamabad much quicker than the larger lorries.

Establishing fresh fruit supply chains will require considerable work – introducing commercial varieties, improving farmer post-harvest skills and establishing producer organisations. For this reason, this activity is given a medium-term priority, allowing the Project to carry out much of the preparatory work, through other activities as described above, beforehand.

Potential impact:

Approximately 40 traders would benefit from the cold chain. Each trader would sell 60 tonnes of apricot to retailers at PKR60/kg compared to PKR40/kg previously received from auction markets, increasing incomes by US$12,632/year.

The cold chain infrastructure can be used for all fresh produce, not just apricot, so has the potential for widespread impact in the long-term.

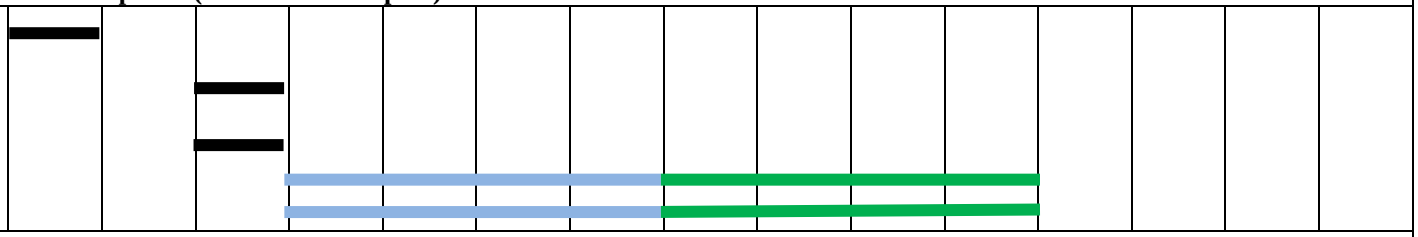
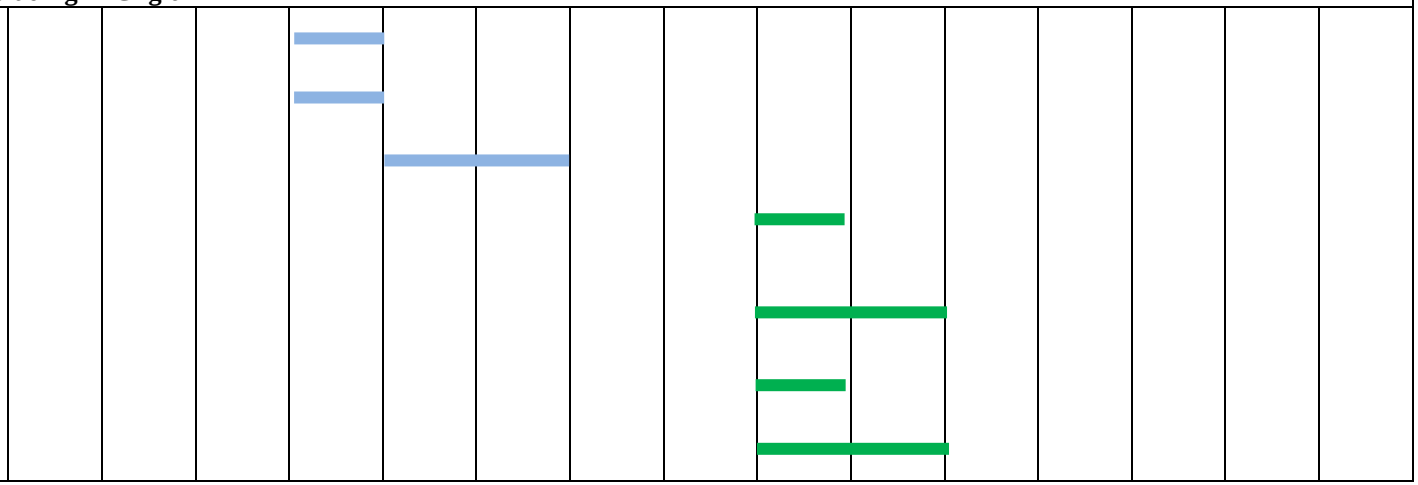
Source of finance	Priority:
Support to FEG clusters, farmer associations, business associations and cooperatives. Estimated Cost: US$410,000	Long-term (over next 30 months)

Further Study Required

- Identify suitable fresh fruit traders to support.
- Identify suitable fresh fruit buyers to link with – market survey in Dubai and with down-country supermarkets.
- Consultation to decide on implementation strategy – wholesale market or individual traders.
- Identify most suitable cold storage and fresh fruit trading technology.

6.0 TIMELINE & BUDGET

Activity / Year	Year 2			Year 3				Year 4				Year 5			
Quarter	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
a) Introduce, propagate and distribute improved commercial cultivars															
• Develop distribution strategy with MARC.															
• Identify and purchase commercial cultivars.															
• Establish clonal garden with MARC.															
• Bud/graft onto FEG trees.															
• Upgrade nurseries.															
b) Improve orchard management and on-farm processing skills of apricot producers															
• Identify potential clusters of apricot FEGs.															
• Establish FEG.															
• FEG management training.															
• Establish orchards.															
• Training orchard management.															
• Provide drying equipment.															
• Training post-harvest practices.															
• Establish links with buyers.															
c) Support product development for processed apricots															
• Scoping survey to identify new processed apricot products.															
• Exposure trips to other processors.															
• Provide equipment/training to produce new products.															
• Training and certification in food safety and quality management systems.															
• Organic and GI certification.															

d) Promote market linkages for quality processed apricot (domestic and export)	
• Identify potential domestic and overseas buyers. • Establish GB Fruit Processors Association. • Develop marketing strategy. • Attend trade missions/fairs. • Implement marketing strategy.	
e) Develop infrastructure for fresh fruit trading in Gilgit	
• Identify fresh fruit traders to partner with. • Identify fresh fruit buyers – domestic & export. • Prepare implementation strategy – wholesale market or individual trader. • Provide washing/grading/packing line to FEG clusters. • Train FEG in harvest, washing/grading/packing techniques. • Establish central cold store and refrigerated transport facilities in Gilgit. • Train traders on cold chain management.	

Activity / item	Budget (US$)	
a) Introduce, propagate and distribute improved commercial cultivars		
Improved seedlings and establishment of MARC clonal garden	25,000	
10 x upgraded DoA nurseries @ $2,000	20,000	
Training FEG and fast-track budding/grafting	5,000	
Sub-total		50,000
b) Improve orchard management and on-farm processing skills of apricot producers		
40 x orchard establishment @ $2,000	80,000	
40 x FEG training	40,000	
600 x drying equipment @ $500	300,000	
Sub-total		420,000
c) Support product development for processed apricots		
Processing equipment	40,000	
Exposure trips	100,000	
Training	20,000	
Certification	100,000	
Sub-total		260,000
d) Promote market linkages for quality processed apricot (domestic and export)		
Establish Fruit Processor Association	10,000	
Trade missions/fairs	100,000	
Marketing & promotion	50,000	
Sub-total		160,000
e) Develop infrastructure for fresh fruit trading in Gilgit		
1 x cold store and associated equipment	100,000	
20 x washing, grading, packing units @ $5,000	100,000	
10 x refrigerated vans @ $15,000	150,000	
Training	10,000	
Sub-total		360,000
TOTAL	**1,250,000**	

ANNEXES

Annex A: Documents Reviewed

AKRSP (2010) *Basic Study on Horticulture Sector in Gilgit Baltistan,* JICA

Apex (2010) *Commercial Potential of GB Apricot*, SDC

ASF (2012) *Annual Work Plan 2012/2013,* USAID

ASF (2012) *Participatory Rapid Horticulture Appraisal Report*, Gilgit-Baltistan

ASF (2013) *Scoping Statement for Environmental Assessment,* USAID

ASF (2012) *The Agribusiness Project: Annual Progress Report 2011/2012,* USAID

ASF (2013) *The Agribusiness Project: Quarterly Report Oct-Dec 2012*, USAID

Chemonics (2011) *Dried Apricot: Kyrgyz Republic,* USAID

Harutyunyan G (2012) *Apricot Value Chain in Armenia*, Shen NGO

Hashmi & Shafiullah (2003) *Agriculture and Food Security: Northern Areas,* IUCN Pakistan

Knowles R (2012) *Horticulture Value Chain Assessment*, CNFA

Ministry of Food & Agriculture (Undated) *Horticulture Policy: Gilgit-Baltistan (Draft)*

NUDHA (2008) *Apricots in Afghanistan,* Intercooperation

World Bank (2011) *Gilgit Baltistan Economic Report*

Annex B: Persons Met

Name	Designation	Location
Sher Ghazi	Chief Executive, Mountain Fruits Ltd	Gilgit
Akbar Shah	CEO, Hashwan Traders	Gilgit
Muhammad Iqbal	Apricot farmer	Gilgit
Malik Miskeen	Private nursery owner	Gilgit
Javed Akhtar	Deputy Director, Department of Agriculture	Gilgit
Sher Baz Khan	MD, Hunza Oil Industries	Gilgit
Shafiullah	Director, Mountain Agricultural Research	Gilgit
Izhar Ali Hunzai	Council	Islamabad
Qurban Ali	CEO, Karakoram Natural Resources Ltd	Islamabad
Meharban Karim	Vice President, Gilgit-Baltistan Chamber of	Islamabad
Sher Jahan	Commerce	Islamabad
Emad Ahmed	Dried apricot and apricot oil exporter	Islamabad
	Director, Water Management, Gilgit DoA	
	CEO, Botanica Organo	

Annex C: Performance Scoring Matrix

Drivers & sub-factors	Controllability				Relevance		Weight	Drivers evaluation
	CF	*CG*	*QC*	*NC*				
1. Enabling Environment		●						
Policies		●			U	-1	0.2	-0.2
Taxes		●			VF	2	0.1	0.2
Licensing		●			F	1	0.05	0.05
Infrastructure		●			VU	-2	0.2	-0.4
Export procedures		●			F	1	0.1	0.1
Market information			●		VU	-2	0.05	-0.1
Financing			●		F	1	0.05	0.05
Trade agreements		●			F	1	0.05	0.05
Sector support programmes			●		U	-1	0.1	-0.1
Standards		●			U	-1	0.1	-0.1
Total							*1*	*-0.45*
2. Technology								
2.1 Production								
Cultivar development			●		VU	-2	0.1	-0.2
Seedling propagation			●		F	1	0.1	0.1
Orchard management			●		VU	-2	0.2	-0.4
Harvest techniques			●		U	-1	0.1	-0.1
On-farm primary processing			●		U	-1	0.1	-0.1
On-farm storage			●		U	-1	0.15	-0.15
Extension services / training		●			VU	-2	0.15	-0.3
Research & development			●		U	-1	0.1	-0.1
Total							*1*	*-1.25*
2.2 Processing (off-farm)								
Processing equipment			●		F	1	0.3	0.3
Packaging			●		F	1	0.2	0.2
Storage technology			●		F	1	0.3	0.3
Research & development			●		U	0	0.2	0
Total							*1*	*0.8*
2.3 Trading								
Handling & storage			●		F	1	0.3	0.3
Communication			●		F	1	0.3	0.3
Transport			●		F	1	0.4	0.4
Total							*1*	*1*
3. Market Structure								
3.1 Production								
Number of producers				●	VF	2	0.3	0.6
Number of buyers				●	F	1	0.4	0.4
Barriers to entry		●			N	0	0.3	0
Total							*1*	*1*
3.2 Processing								
Number of processors				●	U	-1	0.3	-0.3
Number of buyers				●	U	-1	0.4	-0.4
Barriers to entry		●			N	0	0.3	0
Total							*1*	*-0.7*
3.3 Trading								
Number of traders				●	F	1	0.3	0.3
Number of buyers				●	F	1	0.4	0.4
Barriers to entry		●			F	1	0.3	0.3
Total							*1*	*1*

Drivers & sub-factors	Controllability				Relevance		Weight	Drivers evaluation
4. Coordination								
4.1 Production								
Presence of producer groups in production areas			●		F	1	0.3	0.3
Effectiveness of services provided by producer groups	●				N	0	0.4	0
Use of long-term binding agreements with buyers	●				U	-1	0.3	-0.3
Total							*1*	*0*
4.2 Processing								
Collaboration between processors to access markets	●				U	-1	0.2	-0.2
Use of contracts or binding agreements with suppliers	●				F	1	0.4	0.4
Use of contracts or binding agreements with buyers	●				F	1	0.4	0.4
Total							*1*	*0.6*
4.3 Trading								
Collaboration between traders to access markets	●				F	1	0.2	0.2
Use of contracts or binding agreements with suppliers	●				N	0	0.4	0
Use of contracts or binding agreements with buyers	●				N	0	0.4	0
Total							*1*	*0.2*
5. Firm Management								
5.1 Production								
Planning	●				F	1	0.25	0.25
Organising	●				N	0	0.25	0
Staffing	●				N	0	0.1	0
Leading / directing	●				F	1	0.1	0.1
Controlling / monitoring	●				U	-1	0.1	-0.1
Motivation	●				VU	-2	0.1	-0.2
Innovation	●				VU	-2	0.1	-0.2
Total							*1*	*-0.15*
5.2 Processing								
Planning	●				F	1	0.3	0.3
Organising	●				F	1	0.3	0.3
Staffing	●				F	1	0.05	0.05
Leading / directing	●				F	1	0.05	0.05
Controlling / monitoring	●				F	1	0.1	0.1
Motivation	●				F	1	0.1	0.1
Innovation	●				F	1	0.1	0.1
Total							*1*	*1*
5.3 Trading								
Planning	●				N	0	0.3	0
Organising	●				F	1	0.3	0.3
Staffing	●				F	1	0.05	0.05
Leading / directing	●				F	1	0.05	0.05
Controlling / monitoring	●				F	1	0.1	0.1
Motivation	●				F	1	0.1	0.1
Innovation	●				U	-1	0.1	-0.1
Total							*1*	*0.5*
6. Availability of Inputs								
6.1 Production								
Seedlings			●		VU	-2	0.2	-0.4

Drivers & sub-factors	Controllability				Relevance		Weight	Drivers evaluation
Sprays & fertilisers			●		F	1	0.1	0.1
Irrigation	●				U	-1	0.15	-0.15
Land				●	VU	-2	0.2	-0.4
Storage	●				U	-1	0.15	-0.15
Labour				●	F	1	0.1	0.1
Finance			●		F	1	0.1	0.1
Total							*1*	*-0.8*
6.2 Processing								
Raw materials - apricot				●	F	1	0.2	0.2
Machinery	●				F	1	0.2	0.2
Power / electricity		●			VU	-2	0.2	-0.4
Packaging	●				F	1	0.1	0.1
Storage	●				F	1	0.1	0.1
Labour				●	F	1	0.1	0.1
Finance			●		F	1	0.1	0.1
Total							*1*	*0.4*
6.3 Trading								
Product				●	F	1	0.3	0.3
Packaging	●				VU	-2	0.1	-0.2
Storage	●				VU	-2	0.1	-0.2
Transport			●		VU	-2	0.2	-0.4
Information & communication technology	●				F	1	0.1	0.1
Labour				●	F	1	0.1	0.1
Finance			●		F	1	0.1	0.1
Total							*1*	*-0.2*

Annex D: Detailed Background Information

PAKISTAN

Pakistan is a lower-middle income country and has the sixth largest population in the world. Basic socio-economic data is presented in Table a) below.

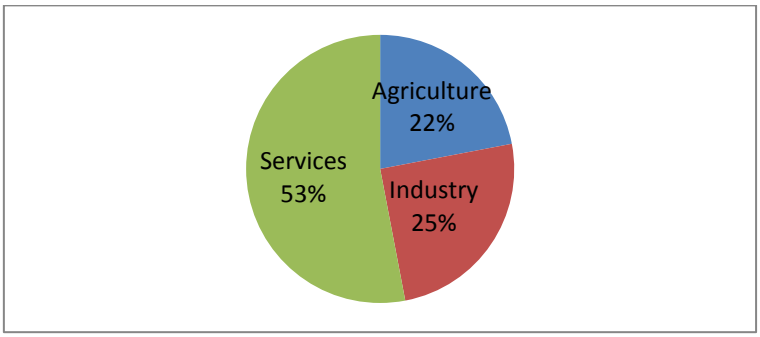
Table a): Pakistan Socio-Economic Data 2011

Population Population growth Life expectancy	176.7 million 1.8% 65 years
Gross National Income per capita GDP growth Inflation	US$1,120 2.9% 11.9%
Population living below the poverty line Urbanisation	22% (2006) 37%

Source: World Bank, 2011

Sector contributions towards Gross Domestic Product (GDP) is shown in Figure a). The agriculture sector contributes just under a quarter of GDP with growth of 2.4% in 2011. This exceeded industry sector growth of only 0.7% but is less than service sector growth of 4.5%.[9]

Figure a): Pakistan Sector Contribution to GDP



Source: ADB 2011

GILGIT-BALTISTAN

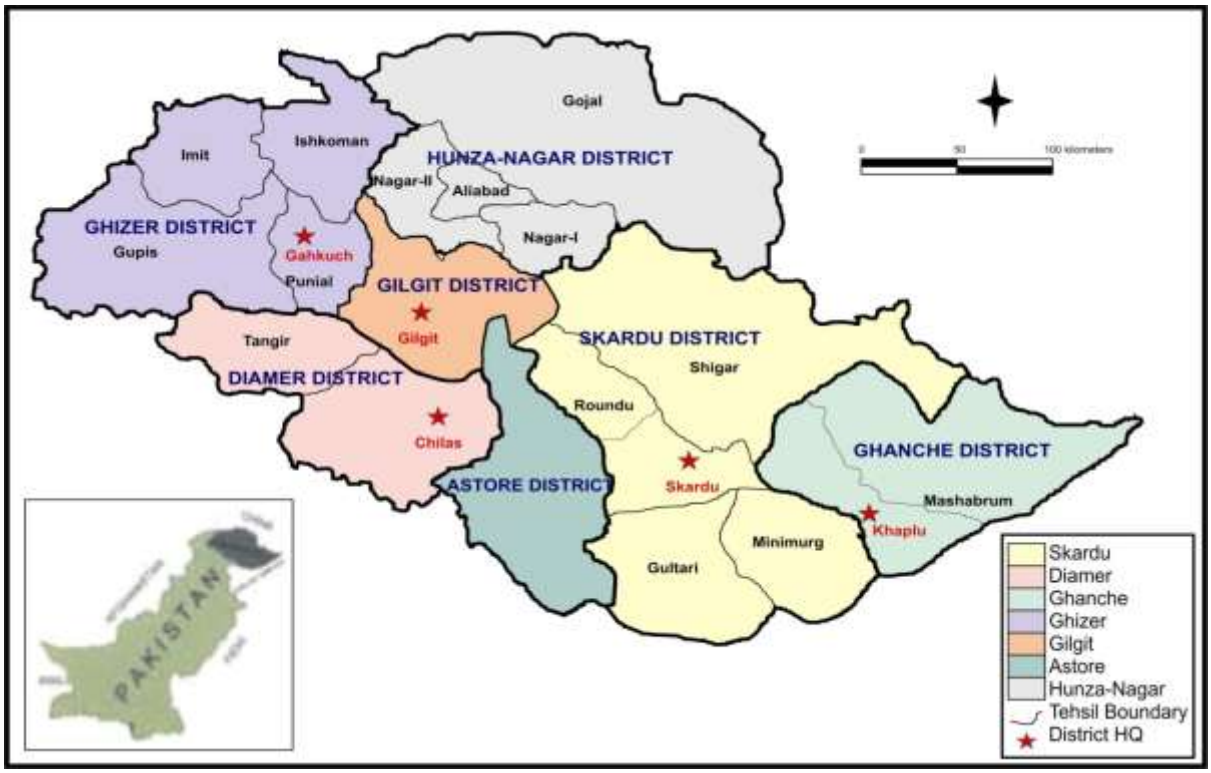
Gilgit-Baltistan (GB) is a self-governed region in the north of Pakistan. Since partition, the governance system has undergone several transitions and in late 2009 the Government of Pakistan (GoP) granted the region 'Provincial equivalent status' with a full set of institutional reforms to bring it at par with other provinces.

The region is geographically isolated, the population small and dispersed, the terrain harsh and weather conditions variable. GB borders Wakhan province of Afghanistan to the north, Xingjian province of China to the northeast, and Indian administered Jammu and Kashmir to the southeast. To the south, GB borders Pakistan administered Azad Jammu and Kashmir.

Figure b) shows a map of GB and its seven districts, which cover a total area of 72,496km². The population of GB was estimated at 1,115,687 in 2007, with over half the population living in Gilgit and Skardu districts.

[9] ADB, 2011

Figure b): Gilgit-Baltistan Map



Source: AKRSP (2010) *Basic Study on Horticulture Sector in Gilgit Baltistan,* JICA

Much of the landscape is mountainous with most settlements located between 1,000 and 3,000m above sea-level, although several of the highest peaks reach over 8,000m. Annual rainfall is between 100 and 500mm with most streams, rivers and irrigation schemes originating from glaciers and snow melt. There are four agro-climatic zones, based upon altitude, as shown in Table b). The climate is temperate with temperatures ranging from -30°C in winter to +47°C in summer.

Table b): GB Agro-Climatic Zones

Zone	Characteristics
Double cropping zone	<1,900m asl. Typically winter wheat followed by maize.
Intermediate zone	1,900 – 2,300m asl. Marginal double cropping zone through use of short-season crops and early maturing varieties e.g. wheat/barley and vegetables. Main apricot growing zone.
Single cropping zone	2,300 – 3,000m asl. Typically barley or vegetables.
Alpine pasture	>3,000m asl. No cultivation.

Source: AKRSP (2010) *Basic Study on Horticulture Sector in Gilgit Baltistan,* JICA

Table c) shows land-use in GB. Due to the mountainous terrain only 2% is cultivable, of which about 1% is currently farmed. The remainder is left barren due to lack of irrigation. The average landholding in GB is approximately 0.75ha per household.

Table c): GB Land Use

Land Type	Area ('000ha)	Percentage of Total Area

Mountains/Lakes/Rivers/Glaciers	4,810	66
Forest	646	9
Pasture	1,646	23
Cultivated Area	58	1
Cultivable barren lands	90	1
Total	**7,250**	**100**

Source: NASSD, 2003

Table d) shows agricultural production in GB. Wheat, maize and barley are important food crops with the majority being used for home consumption. Fruit, nuts and vegetables such as potato are consumed and also sold to generate cash income.

Table d): Agricultural Production in GB

Crop	Area (ha)	Production (T)
Fruit & nuts	25,012	169,373
Wheat	17,090	36,835
Maize	17,685	47,010
Barley	5,281	9.851
Vegetables	10,109	153,017

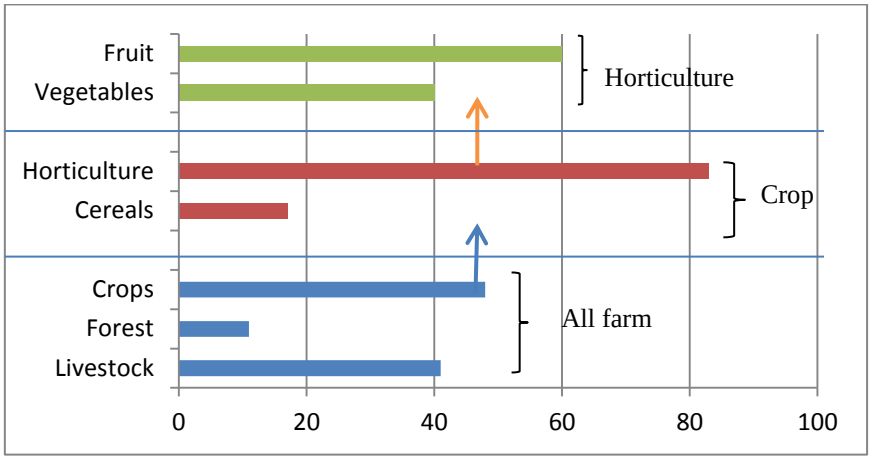
Source: GB DoA statistics 2008

On average 41% of household income is sourced on-farm with 59% sourced off-farm through small business, seasonal labour or professional employment.[10] Agricultural production is mostly subsistence and only a small amount is marketed. In 2008, per capita income averaged PKR29, 426, or just 49% of the national average.[11]

Figure c) shows contribution shares of farm income. The largest share of farm income is derived from crops (48%), including cereals and horticulture. The vast majority of crop income originates from horticulture (83%), of which 60% is fruit such as apricot, apples, mulberry, cherry and grapes.

[10] SESNAC AKRSP, 2007
[11] SESGBC, 2008

Figure c): Percentage Share of Farm Income



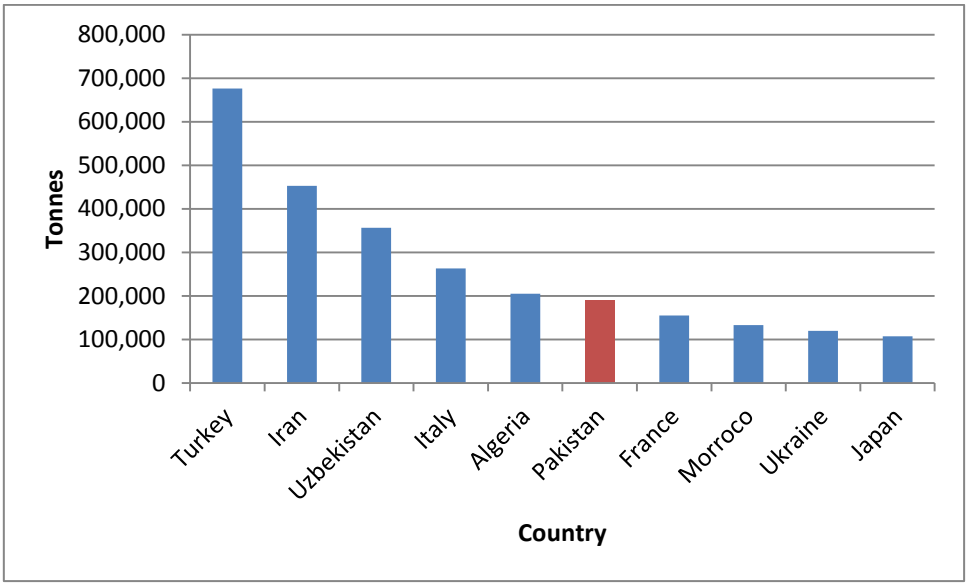
Source: SESGBC, 2008

APRICOT: THE GLOBAL CONTEXT

Production

Figure d) shows the production of fresh apricots for the ten largest producers by quantity. Turkey is the world's largest producer, growing 676,000 tonnes of fresh apricot in 2011. As seen in Figure e), production has remained much the same between 2008 and 2011 at around 3.8 million tonnes/year.

Figure d): Apricot Production 2011



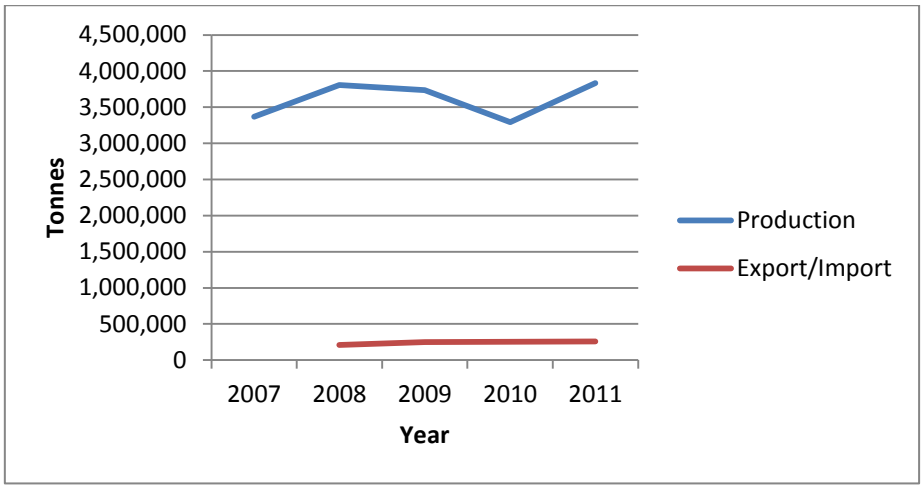
Source: FAOSTAT

National statistics for Pakistan must be understood within the political context. Due to GB's political status, national statistics have not included GB figures. Figure d) above states Pakistan produced a total of 189,000 tonnes and the Pakistan Bureau of Statistics states Balochistan region alone produced 176,000 tonnes of apricot in 2010/11. As GB produces in excess of 100,000 tonnes this would put Pakistan as the fourth largest apricot producer in the world, instead of sixth.

Consumption

Consumption figures for apricot are not available; therefore, consumption trends are assumed from production, export and import figures, as shown in Figure e). As total world production has remained at about 3.8 million tonnes and export/imports remained at around 250,000 tonnes, it can be assumed global apricot consumption has remained more or less stagnant since 2008.

Figure e): Assumed Apricot Consumption



Source: FAOSTAT and ITC data

Trade Flows

Apricots are traded fresh, dried, canned, or processed into products such as jams and juices. From Figure e) above it can be seen the majority of apricots are consumed by producing countries and approximately only 7% of production is traded.

- *Fresh Apricot*

The largest volumes of apricots traded are fresh apricots. Table e) shows that exports have steadily increased by 21% from 2008 to 2011. Although France is only the world's seventh largest producer of apricots, in 2011 it exported 31% of its harvest, which is 19% of total world exports, making it the global leader. France, Spain, Turkey and Uzbekistan accounted for 53% of total fresh apricot exports.

Table e): Fresh Apricot Exports (Tons)

Year/Country	2008	2009	2010	2011
World	*209,797*	*250,374*	*253,215*	*253,267*
France	29,155	60,327	47,812	48,650
Spain	35,658	40,901	29,157	31,456
Turkey	22,101	18,446	25,845	28,489
Uzbekistan	9,781	15,211	21,552	26,629

Source: ITC

Table f) shows that fresh apricot imports have steadily increased since 2008 by 24%. Russia is the largest importer and in 2011 accounted for 24% of world imports. Russia, Germany and Italy together accounted for 50% of the world's imports.

Table f): Fresh Apricot Imports (Tons)

Year/Country	2008	2009	2010	2011
World	*210,980*	*251,796*	*250,221*	*261,737*
Russia	57,779	58,481	54,850	61,915
Germany	36,943	45,588	45,702	44,280
Italy	16,267	32,983	16,059	23,781
Kazakhstan	251	327	4,663	17,682

Source: ITC

- *Dried Apricot*

Although worth more in value than fresh apricot, dried apricot exports have slightly decreased since 2008. As well as being the world's largest producer of apricots, Turkey is the leading exporter, exporting 62% of all world exports in 2011 (see Table g).

Table g): Dried Apricot Exports (Tons)

Year/Country	2008	2009	2010	2011
World	*147,028*	*152,440*	*144,487*	*146,649*
Turkey	98,178	101,234	92,687	90,321
Tajikistan	26,403	32,233	29,847	23,544
Uzbekistan	2,999	4,315	5,580	9,407
Kazakstan	0	21	0	5,394

Source: ITC

Table h) shows that imports of dried apricots have also decreased since 2008. Previously Russia was the world's largest importer; however, most recent statistics show imports more than halved in 2011. Also, Kazakhstan rose from being a minor importer to a world leader in the same year. Although also declining, traditional American and British markets have remained comparatively stable over recent years.

Table h): Dried Apricot Imports (Tons)

Year/Country	2008	2009	2010	2011
World	*150,441*	*151,488*	*147,374*	*138,256*
Kazakhstan	96	742	3,597	24,876
Russian Federation	46,686	48,768	44,815	18.364
USA	14,588	15,238	13,499	13,715
UK	11,345	10,069	9,865	9,050

Source: ITC

- *Processed Apricot*

Table i) shows that exports of processed apricot have fluctuated over recent years but have increased slightly in 2011, when Spain, Greece and South Africa exported 50% of the world's processed apricots.

Table i): Processed Apricot Exports (Tons)

Year/Country	2008	2009	2010	2011
World	*131,940*	*116,528*	*121,312*	*138,368*
Spain	19,913	20,354	17,785	24,496
Greece	16,102	8,626	17,189	23,010
South Africa	25,386	22,839	22,226	20,291
China	20,458	15,948	15,507	18,783

Source: ITC

Table j) shows imports of processed apricots have slightly decreased since 2008. France, Germany and Netherlands imported 52% of the world's processed apricots in 2011. Although traditional European markets have remained comparatively steady, Russian imports have decreased by 41% since 2008.

Table j): Processed Apricot Imports (Tons)

Year/Country	2008	2009	2010	2011
World	*163,580*	*136,743*	*146,609*	*160,214*
France	38,774	33,296	36,787	36,993
Germany	33,844	32,349	34,702	34,295
Netherlands	8,933	8,521	10,539	12,590
Russian Federation	17,032	7,271	9,889	10,107

Source: ITC

Current Market Trends

Increasing trade in fresh apricot

From the statistics presented above it can be seen that whilst trade in dried and processed apricot is stagnating or even declining, trade in fresh apricot is increasing. Trade in fresh apricot has increased through improvements in cold-chain and transport technology.

Processing into pre-prepared health snacks

Dried apricots are increasingly being mixed with other ingredients to produce health products such as pre-prepared apricot yoghurt and cereal/fruit bars.

Use of 'Organic certification' as a marketing tool

Apricot is often regarded as a health food. As such, there is also consumer interest in organic certified products. Certification can be used as a marketing tool to differentiate against similar competitor's products and in some cases gain a price premium.

THE PAKISTAN APRICOT SECTOR

Enabling Environment

Government policy

The National Agriculture Policy (2009-14) follows a two-pronged strategy: a) increased agricultural growth through bringing additional area under cultivation at the farm and country level; and, b) modernising agriculture through farm mechanisation, crop diversification, value-addition, and promotion of latest agricultural technologies.

At present, the GB Department of Agriculture does not have an agricultural policy and receives less than 2% of the funds allocated to the Annual Development Plan.[12] Nonetheless, the GB Department of Agriculture has prepared a draft Horticulture Policy which seeks to 'transform the horticulture sector into a viable, sustainable, profitable, market driven and export-based horticulture industry'.

[12] World Bank (2011) *Gilgit Baltistan Economic Report*

Policy objectives include:[13]

- Establish a demand driven Research System and strengthen the Agriculture Extension Department
- Develop a reliable crop forecasting and market information system
- Extend and improve the quality of infrastructure, particularly in production areas
- Establish certified fruit nurseries, seed production, and processing centers
- Establish modern pack-house and cold chain infrastructure
- Develop supply chains that provide availability of required quantity and quality inputs in a timely manner
- Increase productivity through the sustainable use of soil, climate, and human resources and minimize the pre- and post-harvest losses
- Promote public-private sector partnership throughout the value chain
- Establish a Horticulture Development Board
- Establish a Horticulture Germplasm Unit

Regulatory framework

- *Licenses*

Licenses are not required for small-scale trading or for exporting. However, exporting companies must be tax registered and members of the local Chamber of Commerce.

- *Taxes*

GB is designated a tax-free zone and no company or personal income taxes are levied. Nonetheless, value-added and export taxes are applied.

Infrastructure

- *Transport*

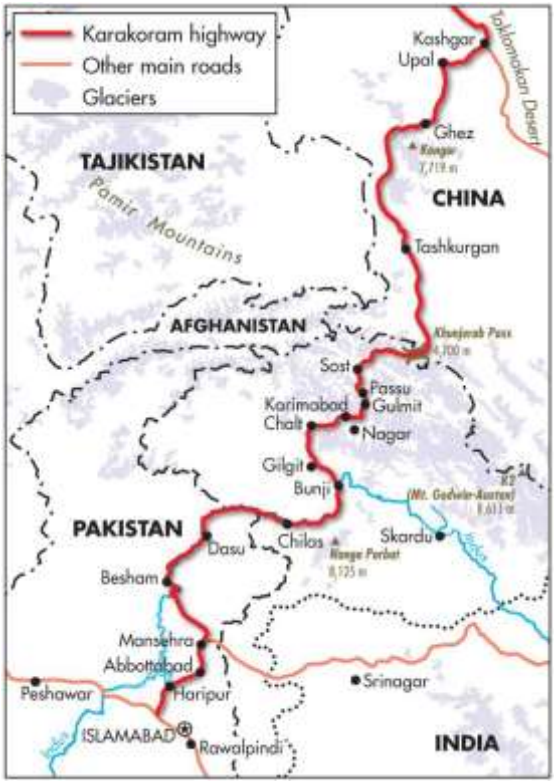
GB has a total 4,997km of road, providing a road density of 0.06km/km², the lowest in Pakistan, although road length per million people is the second highest in Pakistan.[14] About 27%, or 1,361km, are sealed asphalted roads, with the remaining 3,636km being unsealed shingle roads.

Much of the sealed road belongs to the Karakoram Highway (KKH). The KKH is 1,200km long and runs from Islamabad north through Gilgit, past the Sost Dry Port, crosses over into China at the Khunjerab Pass, and finally reaches Kashgar in the Xinjiang Autonomous Region of China. A map of the KKH is shown in Figure f).

Major investments have also been made in the Sost Dry Port (SDP), which lies on the KKH about 90km from the border with China, and provides facilities for trans-shipment and inspection.

[13] Ministry of Food & Agriculture (Undated) *Horticulture Policy: Gilgit-Baltistan (Draft)*
[14] World Bank (2011) *Gilgit Baltistan Economic Report*

Figure f): KKH Highway



In terms of Pakistan's exports to China, shipments through GB constituted only 1.5% of all exports, while 83% of exported goods left from Karachi.[15] The KKH is closed for three months of the year during winter, and additional closures due to landslides are common. The opening of Babusar-Naraan road is expected to improve road access to Islamabad. Armed hijacking along the KKH is not unknown, further dissuading many people from travelling overland in favour of flying.

GB has air links with Islamabad through airports at Gilgit and Skardu. Weather permitting, daily flights are operated exclusively by Pakistan International Airlines.

- *Power*

Although main district towns have been electrified through hydro-schemes, coverage is limited in rural areas. The reliance on hydro-power can mean disrupted supply in the winter as there is less glacial melt to run the turbines. Average installed capacity per capita (kW per thousand) in GB is less than the Pakistan average and less of the GB population has access to electricity (47%) than other provinces.[16] Although the cost of electricity is subsidised, load-shedding is common, causing daily disruption to power-based industries.

- *Communication*

Gilgit Town has good mobile phone and internet access to the rest of the world.

[15] World Bank (2011) *Gilgit Baltistan Economic Report*
[16] World Bank (2011) *Gilgit Baltistan Economic Report*

Research, development and extension services[17]

Currently, the GB Department of Agriculture (DoA) has over 500 staff with a central directorate in Gilgit and offices in all the district headquarters. One field staff provides extension services to approximately 600 farmers. However, outreach is severely hampered by lack of operational budget.

The DoA has 49 nurseries across the districts and approximately 149,000 seedlings are distributed to farmers each year. Food Processing Units have been established in Gilgit and Skardu to train farmers in the preservation and processing of fruits.

The Mountain Agricultural Research Centre (MARC) is a Federal agency responsible for adaptive research and varietal improvement of crops and livestock, including apricot. Promising fruit tree varieties are disseminated through DoA nurseries.

In addition to The Agribusiness Project, the only other sector support programme for apricot in GB is the JICA funded fruit project.

Finance[18]

GB has 105 formal banks, 19 microfinance institutions and 4,486 informal financial institutions such as cooperative societies. Commercial banks in GB offer several financial products including (i) Agriculture Development loans: long term loans for the purchase of machinery and other components; and (ii) Agriculture production loans: small loans offered to the farmers for purchase of seed, fertilizers and pesticides.

Trade agreements

Pakistan has been a member of the World Trade Organisation since 1995 and is also a member of the South Asian Free Trade Area (SAFTA). Other SAFTA members include Bangladesh, Bhutan, India, Maldives, Nepal and Sri Lanka. In 2006 Pakistan signed a Free Trade Agreement (FTA) with China.

Pakistan does not have an FTA with Russia or the European Union, who are major importers of apricot products. Previously, Pakistan did export apricot to the Middle East and an FTA with the Gulf Cooperation Council, many of whom are members of the Arab League, is in the final stages of negotiation.

Standards and Technical Barriers to Trade

There are no Pakistan 'standards' for apricots; however, there is a Codex standard for dried apricots (Codex No: 130-1981). The Department of Plant Protection is responsible for implementing Sanitary and Phyto-Sanitary measures for plant materials through its quarantine outposts and issues Phyto-Sanitary Certificates according to the requirements and trade agreements signed with the importing countries. However, some countries do not accept this certification and testing is carried out in the importing country.

Certification

Third party voluntary certification, such as GlobalGAP, Hazard Analysis & Critical Control Point (HACCP), Fair Trade and organic, is available in Pakistan.

[17] AKRSP (2010) *Basic Study on Horticulture Sector in Gilgit Baltistan,* JICA

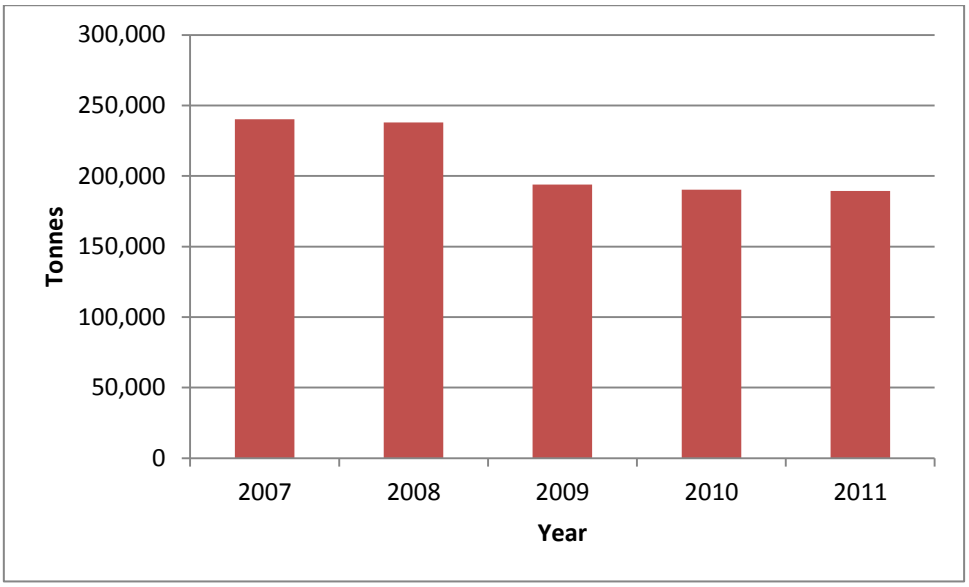
[18] AKRSP (2010) *Basic Study on Horticulture Sector in Gilgit Baltistan,* JICA

Apricot Production

- *Pakistan*

Apricot production for Pakistan is shown in Figure g). These statistics do not include GB production, which is shown in Table k). Since 2007, production has steadily declined in Pakistan due to a decrease in area planted (from 31,256ha in 2007 to 29,634ha in 2011) and declining yields (from 7,684kg/ha fresh fruit in 2007 to 6,392kg/ha in 2011).[19]

Figure g): Pakistan Apricot Production 2007-11



Source: FAOSTAT

- *Gilgit-Baltistan*

It is estimated there are a total of 2,971,935 apricot trees in GB and apricots are the most common fruit grown with an average 15 trees per household.[20] The second most popular fruit is apple with an average 5 trees per household.

Table k) shows area planted and production by district. Planting density is only 230 trees/ha, which is much less than the recommended 750 trees/ha, due to apricots being planted around field edges, rather than orchards. Average yields of fresh fruit are 38kg/tree which is good considering the limited use of inputs, although yields of 50kg/tree can be achieved through improved management.

[19] FAOSTAT
[20] SESGBC, 2008

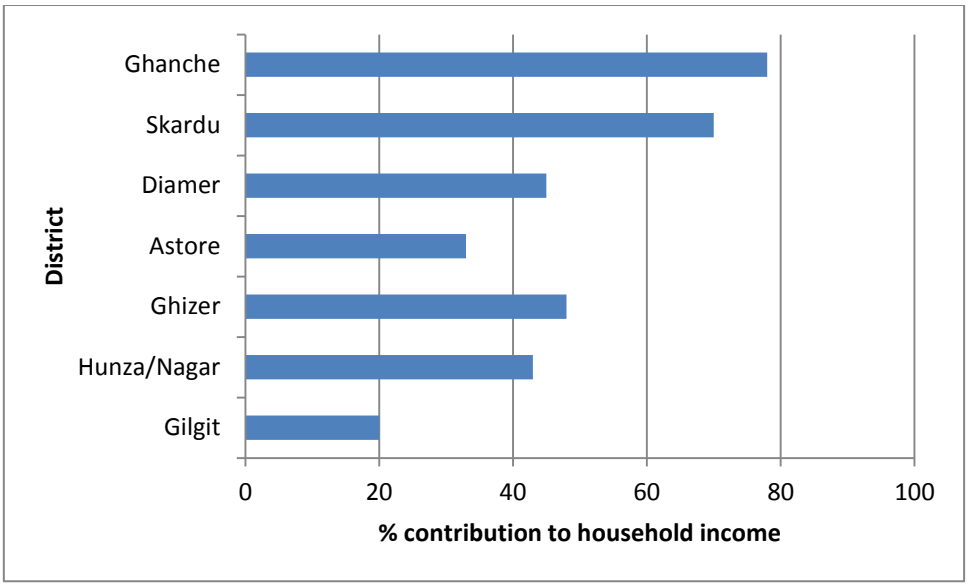
Table k): Apricot Production in GB (2007)

District	Area Planted (ha)	Production (MT)
Gilgit	1,201	9,169
Hunza/Nagar	1,790	21,156
Ghizer	1,475	14,491
Astore	560	2,932
Diamer	537	1,194
Skardu	4,871	40,649
Ghanche	2,487	22,723
Total	**12,921**	**114,286**

Source: Northern Areas Agriculture Statistics 2007, DoA, Gilgit

Area planted and production is highest in Skardu and Ghanche districts, whilst production is also high in Hunza/Nagar district. Astore and Diamer are the two lowest producing districts. Figure h) shows the contribution of apricot sales to farm household income by district. As Gilgit is the regional capital, it is unsurprising only 20% of income is from apricots, as there are other income generating opportunities available. In Ghanche and Skardu districts, apricot sales account for over 70% of farm household income.

Figure h): Apricot Contribution to Household Income



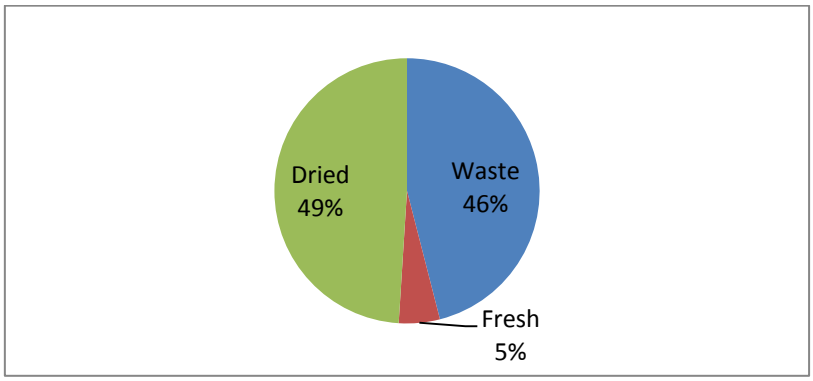
Source: AKRSP (2010) *Basic Study on Horticulture Sector in Gilgit Baltistan,* JICA

Figure i) shows that 46% of the total apricot harvest is wasted, 49% are dried and 5% are eaten fresh. For both fresh and dried apricot, roughly 40% is consumed at home and 60% sold.

The structure of the apricot sector in GB reflects the previous geographical isolation from markets, prior to construction of the KKH. Most of the apricot trees have been propagated by farmers themselves from a wide variety of naturally growing cultivars indigenous to the area. This has resulted in much of the harvest being low quality, unmarketable varieties and explains the high level of wastage. Furthermore, the limited local market meant only enough

apricot was harvested to satisfy local needs, with the remainder being left to waste. Due to the seasonality of production and perishability of fresh apricot, post-harvest drying became necessary for consumption at a later date.

Figure i): Apricot Use



Source: Northern Areas Agriculture Statistics 2007, DoA, Gilgit

Apricot Markets

Table l) shows exports of fresh apricot from Pakistan have decreased considerably since 2007, when significantly more apricots were exported to UK and the Middle East (Saudi Arabia, Bahrain and United Arab Emirates). In 2011, India, UK and USA accounted for 56% of exports. Pakistan is a very small fresh apricot exporter and accounts for only 0.06% of total world exports.[21]

Table l): Pakistan Fresh Apricot Exports (Tons)

Year/Country	2007	2008	2009	2010	2011
Total	*734*	*373*	*109*	*138*	*148*
India	12	10	30	38	46
UK	281	108	6	0	20
Kenya	0	0	0	0	17
USA	3	61	9	24	16

Source: ITC

Table m) shows Pakistan exports a larger amount of dried apricot than fresh apricot, with 51% exported to Germany, UK and India in 2011. Nonetheless, exports of dried apricot have declined by 11% since 2007. Pakistan is a very small dry apricot exporter and accounts for only 0.3% of total world exports.[22]

Table m): Pakistan Dried Apricot Exports (Tons)

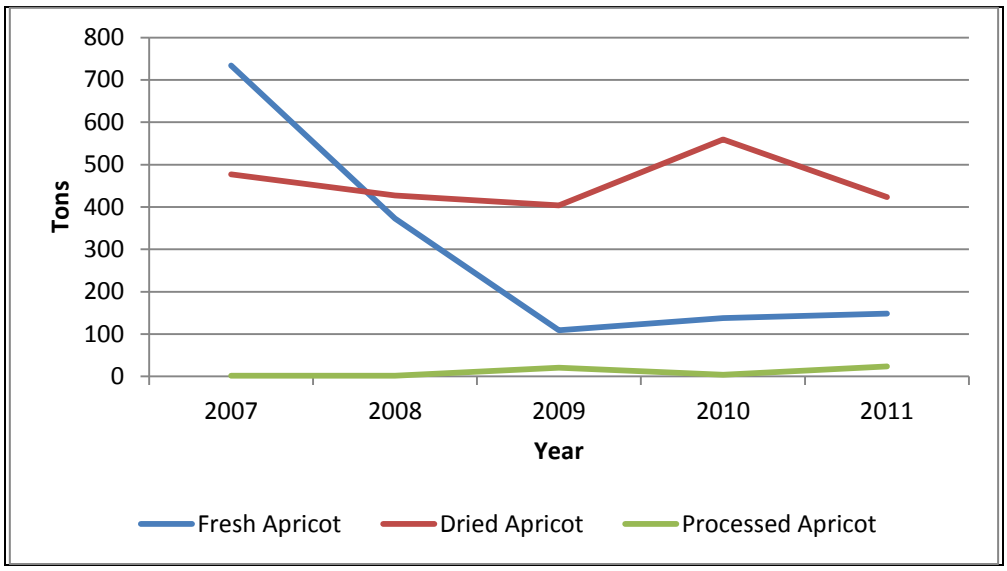
Year/Country	2007	2008	2009	2010	2011
Total	*477*	*427*	*404*	*559*	*423*
Germany	6	112	31	174	87
UK	188	137	120	87	82
India	37	9	15	74	47
USA	48	21	51	39	43

Source: ITC

[21] ITC
[22] ITC

Exports of processed apricot are minor and only 24 tons were exported to Germany in 2011.[23] Figure j) shows Pakistan apricot export trends between 2007 and 2011. Although the export of dried and processed apricots have not changed significantly, a sharp decrease is seen in the export of fresh apricot. This contradicts the rising global trade in fresh apricot.

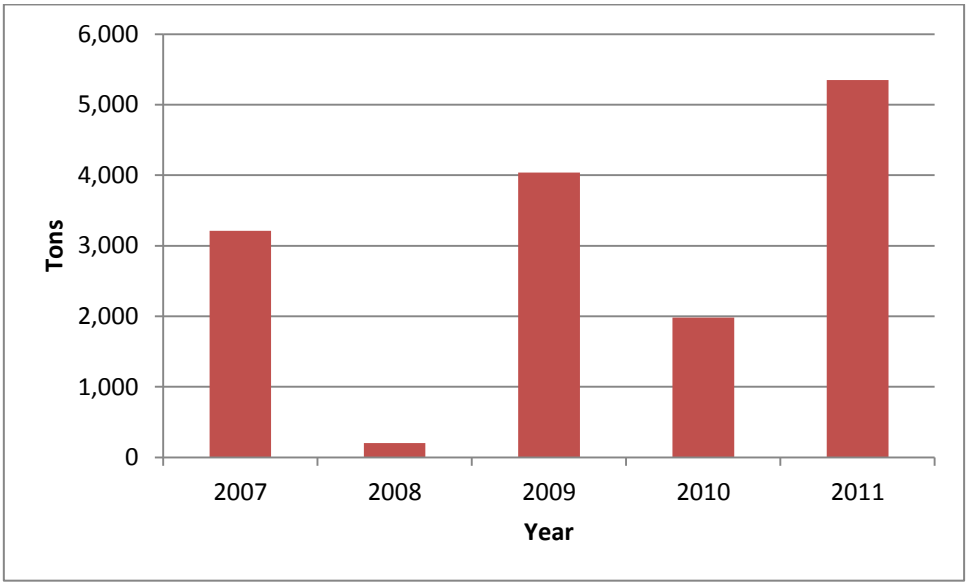
Figure j): Pakistan Apricot Export Trends



Source: ITC

Figure k) shows imports of fresh apricot to Pakistan, which originate almost exclusively from Afghanistan. In 2011, imports totalled 5,351 tons. Afghan apricots are imported through Peshawar and often re-exported overland to India.

Figure k): Pakistan Fresh Apricot Imports



Source: ITC

[23] ITC

THE GB APRICOT SUPPLY CHAIN

Innate and market related commodity characteristics

Approximately 28 apricot varieties or cultivars are found in GB with different characteristics regarding size, colour, sweetness and early/late maturity. Most local varieties have a Brix Value of 14°Bx indicating high sugar content, causing a rapid deterioration after harvest and a shelf-life of only eight hours. [24] The *Charmagaz* variety has white flesh and is eaten fresh. Otherwise the *Shakanda, Hobbi* and *Halman* varieties have a tougher yellow skin, preferred for drying.

Dried apricot is typically sold 'split' with the seed removed. They can also be sold 'whole' with the seed squeezed out, or as 'halves'.

Apricot is a seasonal crop with harvest taking place in June, July and August. Higher prices are paid for early and late maturing varieties. Fruiting is also determined by altitude with apricots ripening earlier in the lower double cropping zone and later in the higher single cropping zone.

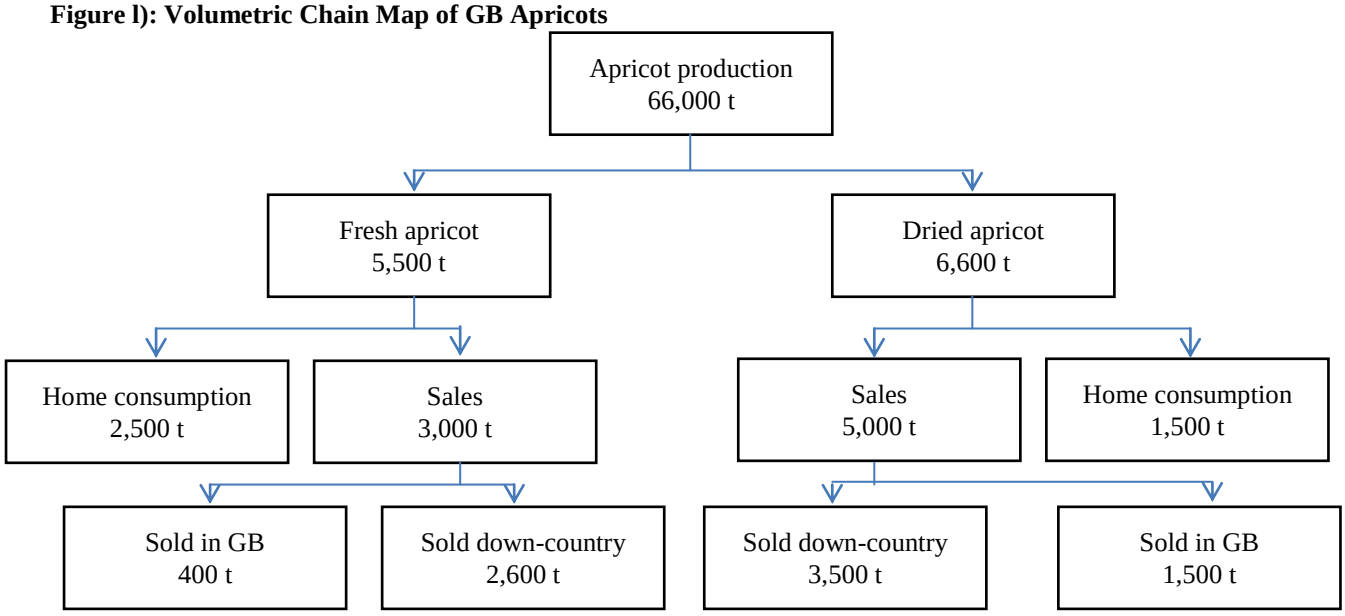
Spatial and volume commodity flows

Figure l) shows a volumetric chain map for GB apricots. Only 8% of apricot produced is eaten fresh, nearly half as home consumption. Three thousand tonnes enter the market, 87% of which is sold down-country with only 400t being sold locally.

For 60,500 tonnes of fresh apricots processed, 6,600 tonnes of dry apricot are produced. Twenty-three per cent is kept for home consumption and 5,000 tonnes are sold on to the market. Thirty per cent is sold locally in GB with 3,500 tonnes being sold down-country.

As most households have apricot trees themselves, the local market is very limited. Of the dried apricot sold down-country, roughly 70% is sold in Rawalpindi.

Figure l): Volumetric Chain Map of GB Apricots



Source: Based upon: Apex (2010) *Commercial Potential of GB Apricot*, SDC

[24] Apex (2010) *Commercial Potential of GB Apricot*, SDC

A spatial chain map for all apricot in Pakistan is shown in Figure m). Main production centres are Gilgit in the north and Balochistan in the south. The largest consumption centre is Karachi (11.1 million population), although the Punjab cluster of Lahore, Faisalabad, Rawalpindi and Islamabad has a combined population of 12.1 million. As such, the Gilgit apricots supply the Punjab market, and the Balochistan apricots supply the Karachi market.

Gilgit apricots are competing with fresh apricots imported from Afghanistan, via Peshawar, some of which are re-exported overland to India. Dried apricots exported to Europe mostly originate from Balochistan and are shipped from Karachi.

Figure m): Spatial Chain Map for Apricots in Pakistan

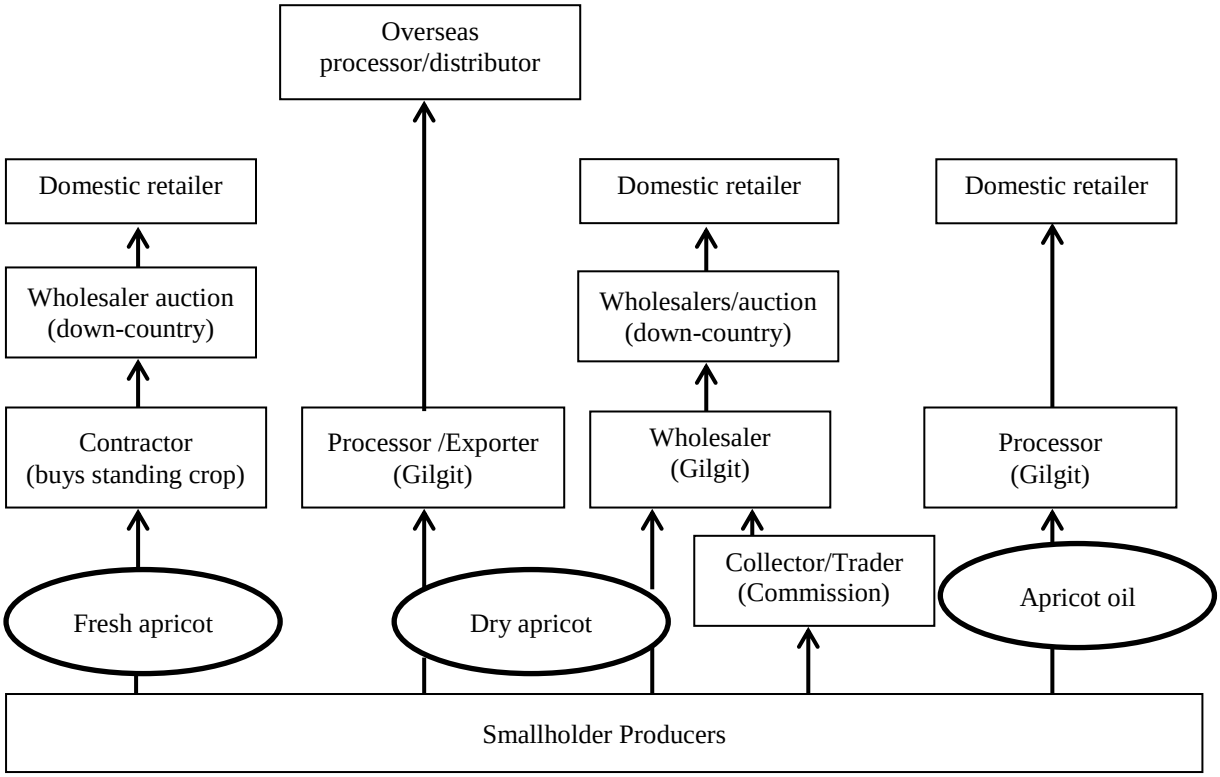
Institutional commodity flows

Figure n) shows the different institutional chain maps for GB apricots. Production is carried out by smallholder producers who also carry out the drying process. The majority of the harvest is dried and sold down-country through auctions. Apricots are bought at farm-gate by collectors/traders or delivered to wholesalers based in Gilgit. The wholesalers in Gilgit usually operate a retail store in the market and trade in several agri-food products, e.g. apricot, cherry, walnut and almond. The Gilgit wholesaler carries out some cleaning and sorting and bag the dried apricot into 50kg hessian bags for transport down-country and sale to wholesalers or through auction markets in other regions (See map above).

There are a few small processors in Gilgit who carry out additional transformation of the dried apricot into a high-value product for export. Dried apricots are bought direct from farmers, then cleaned and graded. The apricot is packed in Gilgit, transported overland to Karachi and shipped in a container via Felixstowe to buyers in UK. Apricot oil processors also buy the discarded kernel from farmers, extract the oil and package it for sale to customers down-country.

Fresh apricot is often bought as a standing crop by a down-country 'contractor'. The contractor pays a lump sum to the farmer and then organises the harvest, packing and transport of the apricot to auction markets down-country.

Figure n): Institutional Chain Map of GB Apricots



GROSS MARGINS AND EMPLOYMENT

Estimates of gross margins and employment generated by apricots are calculated below. Roughly 100,000 farm households produce apricot for market from June to August. Apricot is only one crop cultivated on a farm and only one fruit of many processed and traded. None

of the chain stakeholders are totally dependent on apricot as a source of income or employment.

Fresh apricot

Fresh apricot retails for PKR60/kg (US$0.63/kg), compared to PKR180/kg for dried apricot. However it takes approximately 6kg of fresh apricot to make 1kg of dried apricot and the opportunity cost of dried apricot is PKR360/kg (6 x PKR60). Therefore fresh apricot fetches the highest price in real terms.

Dried apricot

In 2012, farm-gate prices fluctuated between PKR80-140/kg (US$0.84-1.47/kg) for good quality dried apricot, although poor quality prices can be as low as PKR45/kg. Based upon supply, prices are highest early and late season. As no inputs are used for apricot production, costs are negligible. Labour is required for harvest and drying but this is carried out by family members at no cash cost. A conservative farm household income for apricot production is calculated in Table n), based upon harvesting 15 trees with 46% wastage and selling for the lowest price.

Table n): Farm Income from Dried Apricot

Farm Income
15 trees x 38kg/tree = 570kg fresh apricot
Deduct 46% wastage (263kg) = 307kg
Drying: 6kg fresh to 1kg dried apricot = 51kg dried apricot
Farm-gate price of PKR80/kg = **Income PKR4,080 (US$43)**

There are approximately 50 apricot traders in GB employing approximately 200 staff. Prices received by traders for dried apricot delivered to Rawalpindi fluctuated between PKR100-160/kg (US$1.05-1.68/kg) for good quality dried apricot in 2012. A gross margin for traders is shown in Table o).

Table o): Gross Margin for Domestic Dry Apricot Traders

Income: 1kg dried apricot = PKR100
Costs: Dried apricot from farmer = PKR80/kg Transport Gilgit to Rawalpindi = PKR5/kg Labour – sort and bag = PKR10/kg *Sub-total costs = PKR95/kg*
Gross Margin = PKR5/kg

Although margins per kilogramme are small, the larger traders may sell 200 tonnes of apricot in a season providing a gross margin of PKR1,000,000 (US$10,526).

Apricot Oil

There are two commercial apricot oil processors in GB, employing 10 staff and producing approximately 20,000 litres of oil per annum. A gross margin for apricot oil processing is presented in Table p).

Table p): Gross Margin for Apricot Kernel Oil

Income: 1 litre apricot oil = PKR800
Costs: 2.5kg dried apricot kernel from farmer @ = PKR180/kg = PKR450[25] Transport Gilgit to Lahore = PKR6/litre Labour – press and pack = PKR24/litre *Sub-total costs = PKR480/kg*
Gross Margin = PKR320/litre

Table q) shows the total value of fruits produced in GB. Although apricot has a lower unit value than other fruit, gross income is more because of the volume produced. Total apricot income for GB in 2007 was estimated at PKR579,860,000 (US$6,103,789).

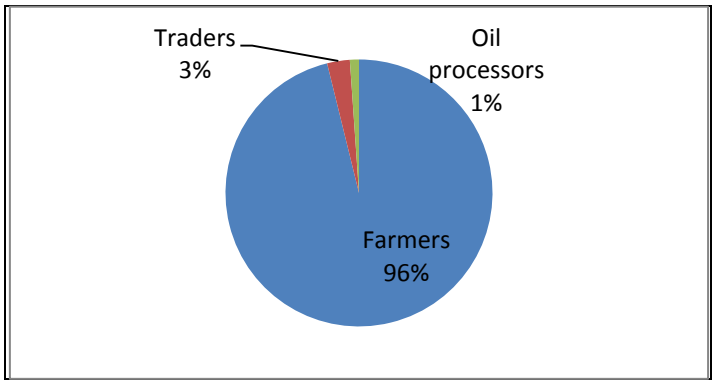
Table q): Total Value of Fruits Produced in GB ('000 PKR)

Fruit	Production (Tonnes)	Average Farm-Gate Price (PKR/kg)	Value ('000 PKR)
Apricot	108,588	5.34	579,860
Apple	19,054	21.20	403,945
Grapes	6,413	30.21	193,737
Pears	2,579	24.45	63,057
Peaches	3,308	14.58	48,231
Pomegranate	4,287	59.52	255,162
Cherry	2,256	94.30	212,741
Walnut	5,992	90.00	539,280
Almond	1,700	120.00	204,000
		Total	**2,500,012**

Source: AKRSP (2010) *Basic Study on Horticulture Sector in Gilgit Baltistan*, JICA

Based upon the above figures, apricot income distribution is estimated in Figure o). Farmers capture 96% of the income for apricot, which is very high and shows the importance of apricot for farm household income in GB.

Figure o): Apricot Income Distribution



[25] 2.5kg kernel makes 1litre oil

VALUE ADDITION ACTIVITIES

Exchange

There is no wholesale auction market for fruit in Gilgit. Prices are negotiated between the farmer and the buyer and are based upon apricot prices in wholesale auction markets down-country. Gilgit wholesalers deduct costs and profit margin from the down-country price to arrive at the farmer price.

There are no market information services but farmers in Gilgit are increasingly able to find price information from wholesale markets down-country via mobile phone.

Processing

Apricot processing in GB is limited to drying and is carried out by farmers as an initial means of preserving the fruit. Additional processing is also carried out by some exporters to improve quality and meet international standards. A by-product of drying apricots is the extraction of oil from the discarded kernel. Figure p) shows the process of transforming fresh apricot into high quality dry apricot for export and also the process of extracting oil from the discarded kernel.

- *Dried Apricot*

Primary processing is undertaken on-farm. Apricot is typically sun-dried on roof-tops for a three day period. The stone is traditionally removed by splitting the apricot, with the apricot turned inside-out and dried for a further 2-3 days. Contamination with dust and dirt is common during this process. To produce whole fruits, the stone can be squeezed out.

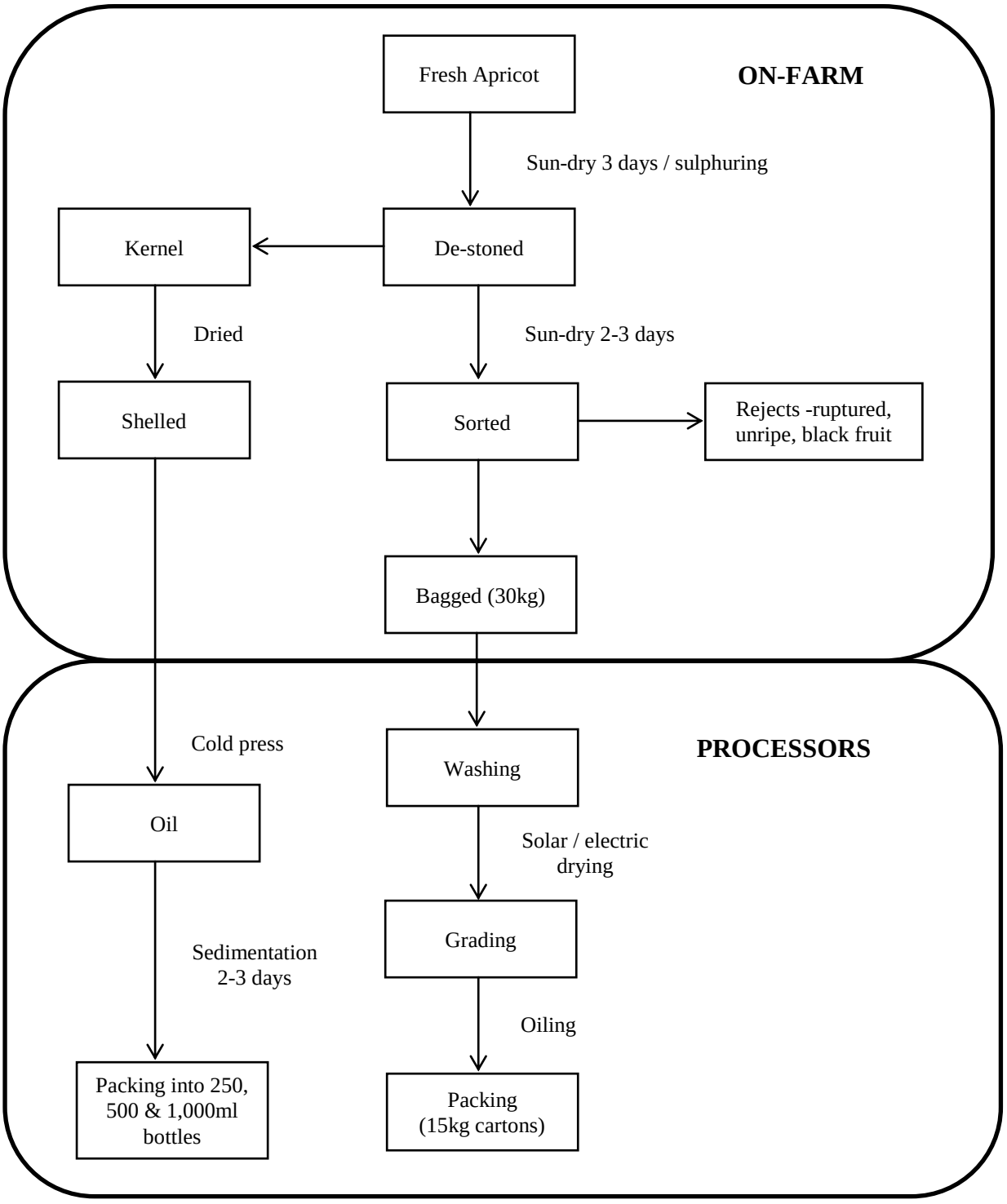
The drying process can be improved through treating the apricot with sulphur dioxide. Sulphuring kills bacteria, retains the bright orange colour and extends shelf-life. The apricots once dried are sorted with any defects such as ruptured, unripe or off-colour fruits, for discard. The apricots are then bagged into 30kg bags for sale to processors.

At this point traditional wholesale traders will carry out some grading before re-bagging the apricot into 50kg bags for transport by truck down-country. However, processors will carry out further washing of the apricot, followed by solar or electric drying. Final quality control is carried out through grading and the apricot oiled to improve appearance. The top quality apricots are then packed into 15kg cartons prior to export.

- *Apricot Oil*

The apricot seed is dried and the shell removed by farmers. The shell is used as fuel for cooking. The remaining kernel is sold to processors and put through a cold-press to extract the oil. Once the oil has been extracted, the residual cake can be used as a livestock feed. The oil is left to settle for 2-3 days and the sediment removed to leave the pure oil. The oil is poured into 250, 500 or 1,000ml bottles and mostly sold to a pharmaceutical company in Lahore to manufacture livestock vaccines. Other uses are as a cooking ingredient and beauty treatment, e.g. body oil/soap/shampoo.

Figure p): Dried Apricot and Kernel Processing



Storage and Transport

Refrigerated transport can be hired from Islamabad but there are no refrigerated storage facilities in GB. Dried apricot does not require any specialised storage apart from being dry, clean and pest free. Traders have their own basic warehouses for bulking up and temporary storage of produce prior to transporting it down country. Transport is often contracted from the several haulage contractors based in Gilgit.

INTRA-FIRM ORGANISATION

Farmers

There are approximately 100,000 farmers in GB producing apricots. The Aga-Khan Rural Support Project (AKRSP) has supported the establishment of Mountain Area Fruit Farmer Associations (MAFFA) which has improved horizontal integration between producers for bulking up produce and accessing markets.

Traditionally, individual farmers will group together through family clans to bulk up produce for sale. However, unless repaying loans, farmers do not have supply contracts with traders and will sell to the trader offering the best price.

Collectors/small traders

There are approximately 35 collectors/small traders who buy from individual farmers at farm-gate. They will often be advanced money by a wholesaler and receive a commission on the amount of apricot bought from farmers and supplied to the wholesalers.

Wholesalers

There are approximately 15 wholesalers in Gilgit who source apricot direct from farmers or through collectors/small traders as described above. Wholesalers sometimes develop long-term relationships with farmers and advance them cash in the winter, in return for the apricot harvest the following summer.

Gilgit wholesalers will supply around three wholesalers in down-country markets. Down-country wholesalers will place individual orders with Gilgit wholesalers. Long-term supply contracts are not common. In times of glut, Gilgit wholesalers will send apricot to the auction market to be sold via a commission agent.

To avoid trucks returning empty to Gilgit there is some reciprocal trading between Gilgit and down-country wholesalers. For example Gilgit wholesalers will sell apricot to the down-country wholesaler and the down-country wholesaler will sell walnut to the Gilgit wholesaler for export to China.

Specifically for the fresh fruit market, there are wholesale contactors who buy the standing crop of apricot and pay a lump sum to the farmer for the whole harvest. The contractor hires labour to harvest the apricot, packs it in 12kg wooden boxes and transports it to auction markets down-country for sale. No sorting or grading is carried out, resulting in poor quality and low prices.

Processors/exporters

Processors/exporters seek to produce a high quality product for export to high-value markets. Processors will invest in training farmers to improve harvest and drying, often providing inputs such as drying trays. Due to this investment, the processors develop a long-term relationship with the farmers. Similarly, the processors develop long-term agreements and supply contracts with overseas buyers. Although vertical integration is evident for processors, there is very little horizontal collaboration between processors to access new markets.